Current Industrial Developments

New Construction and Machinery Requirements

Outstanding Opportunities

Asphalt Refining .....Curtis Bay, Md.
Candy .....Cambridge, Mass.
Cement .....Tampa, Fla.
Chemicals.....Everett, Mass.
Dry Coke Cooling.....Rochester, N. Y.
Enamelware .....Chattanooga, Tenn.
Fertilizer .. ..Alexandria, Va.
Gasoline .....Cromwell, Okla.
Linseed Oil .....Montreal, Que.
Oil Purification .....Pittsburgh, Pa.
Oil Refining .....Seattle, Wash.
Paper .....Lansdale, Pa.
Paper .....Powell River, B. C.
Paper .....Fort Alexander, Man.
Paper .....Iroquois Falls, Ont.
Peroxide .....Buffalo, N. Y.
Pulp & Paper.....St. Helens, Ore.
Pulp & Paper .....Quebec, Que.
Refinery .....Joplin, Mo.
Research Laboratory .. ...Cleveland, O.
Rubber .....Cambridge, Mass.
Water Gas ..... Iron Mountain, Mich.

This page is of value not only as a machinery market but also as an index of the general activity and growth of the industries served by Chem. & Met. The reports are gathered by our regular correspondents who are instructed to verify every detail. Requirements for new machinery will be published here free of charge.

New England

Mass., Cambridge (Boston P. O.)—Cambridge Rubber Co., 748 Main St., awarded contract for the construction of a 4 story, 80 x 100 ft. factory at Main and Windsor Sts. to Scully Co., 118 First St. Estimated cost $125,000.

Mass., Cambridge (Boston P. O.)—Daggett Chocolate Co., 35 Lewis Wharf, Boston, plans the construction of a 2 story plant at Ames and Main Sts. here. Estimated cost $40,000. Architect not selected.

Mass., Everett (Boston P. O.)—Merrimac Chemical Co., 148 State St., Boston, awarded contract for the construction of a 2 story, 75 x 140 ft. manufacturing plant here to W. H. Bailey Co., 88 Broad St., Boston. Estimated cost $100,000.

Mass., Lawrence—Butler Dye House Co., awarded contract for the construction of 2 additional units, consisting of a 2 story 30 x 60 ft. main building and a 1 story, 20 x 30 ft. naphtha building on Walcott Ave. to J. Healey.

Mass., Malden (Boston P. O.)—Boston Rubber Shoe Co., 130 Essex St., Boston, is having plans prepared for the construction of a 2 story plant on Commercial St. Estimated cost $50,000. Company engineers in charge.

Mass., North Dighton—Mt. Hope Finishing Co., awarded contract for the construction of a 1 story, 100 x 200 ft. extension to silk dye house to Central Engineering & Construction Co., 210 Main St., Pawtucket, R. I.

Mass., Watertown (Boston P. O.)—Brunsene Co., Stanley Ave., awarded contract for the construction of a 1 and 2 story, 22 x 150 ft. drying building to W. A. Bailey Co., 88 Broad St., Boston. Estimated cost $40,000.

Mass., Webster—S. Slater & Sons, Inc., awarded contract for the construction of a textile plant including a 2 story, 52 x 103 ft. color shop and a 1 story, 57 x 102 ft. aniline building to H. Wales Lines Co., 134 State St., Meriden, Conn. Estimated cost $40,000.

Middle Atlantic

Md., Curtis Bay (Baltimore P. O.)—Mexican Petroleum Corporation, H. G. Wylie, Pres., 120 Broadway, New York, has work underway on the construction of the first unit of asphalt refinery at Fishing Point here. Estimated cost $1,250,000. Other units are planned when first unit is completed.

N. Y., Buffalo—American Brass Co., 446 Military Road, plans the construtcion of a nickel plating plant. Estimated cost $15,000.

N. Y., Buffalo—Hydrox Chemical Co., 225 West Huron St., Chicago, Ill., plans the construction of a plant for the manufacture of peroxide on River Road here. Estimated cost $150,000.

N. Y. Rochester—The Rochester Gas & Electric Corporation, J. P. Hartfenkamp, Gen. Supt., 34 Clinton Ave. North, awarded contract for a dry coke cooling plant to be installed at the gas works to Sulzer Freres, Winterthur, Switzerland. J. G. White Engineering Corporation, 43 Exchange Pl., New York, in charge of construction.

Pa., James City—Pennsylvania Plate Glass Co., recently organized, is having plans prepared for the construction of a group of buildings. Estimated cost $2,000,000. Simplex Engineering Co., Washington, is engineer.

Pa., Lansdale—Crown Paper Co., plans the construction of a 1 story, 30 x 118 and 75 x 150 ft. manufacturing plant. J. S. Fuller, 5438 Locust St., Philadelphia, is architect.

Pa., Linhart—B. H. Prack, Martin Bldg., Pittsburgh, Engr., is receiving bids for the construction of a 3 story, 100 x 506 ft. brass foundry here for Westinghouse Electric & Mfg. Co., East Pittsburgh. Estimated cost $45,000. Engineer will award separate contracts.

Pa., Marcus Hook—Vicsose Co., awarded contract for the construction of a 2 story, 51 x 129 ft. office building and 25 x 47 ft. fire house to Wark Co., 1600 Walnut St.

Pa., Philadelphia—Ballinger Co., 12th and Chestnut Sts., will receive bids until August 20th for the construction of a 1 story, 234 x 235 ft. dying and cleaning plant at Heiskill and Magnolia Sts., for the Herzog Co., Inc., 5904 Germantown Ave. Estimated cost $200,000.

Pa., Philadelphia—Certainteed Products Corporation, awarded contract for the construction of a 1 story, 48 x 154 and 10 x 24 ft. addition to manufacturing plant at 2nd and Erie Sts., to Stofflet & Tillotson, Wesley Bldg. $54,000.

Pa., Philadelphia—Gill Glass Co., Inc., Amber & Venango St., awarded contract for the construction of a 1 story, 120 x 178 ft. addition to plant to W. R. Doughetty, 1610 Sansom St.

Pa., Philadelphia—Queen City Printing Ink Co., 11th and Hamilton Sts., awarded contract for the construtcion of a 1 story, 60 x 160 ft. manufacturing plant at 1055-1061 Germantown Ave. to Smith Hardican Co., 1809 Callowhill St.

Pa., Pittsburgh—Duquesne Light Co., 435 6th Ave., awarded contract for the construction of a 1 story, 45 x 50 ft. oil purification plant on Beam Ave. to William F. Trimble & Sons Co., 1719 Pennsylvania Ave. Estimated cost $45,000.

South

Fla., Jacksonville—C. L. Capps Co., 1224 East Adams St., plans the construction of a plant including a foundry department for the casting of brass and iron mouldings, on East 8th St.

Fla., Lakeland—The Beltrocide Chemical Corporation, is in the market for machinery for mixing chemicals in powdered form.

Fla., Miami Beach—Gulf Refining Co., 43 South East Fifth St., W. B. Lamb, Dist. Representative, plans to double capacity of plant on Alton Road.

Fla., St. Petersburg—Florida Spanish Tile Mfg. Co., plans the construction of a plant for the manufacture of spanish tile and mosaics. Estimated cost $200,000.

Fla., Tampa—The Signal Mountain Portland Cement Co., James Bldg., Chattanooga, J. L. Senior, Pres. and the Peninsular Portland Cement Co., Cement City, Mich., plan the construction of a new cement plant 2,500,000 bbl. annual capacity here. Estimated cost $5,000,000. Cowham Engineering Co., 111 West Monroe St., Chicago, Ill., in charge of engineering and construction details.

S. C. Charleston—Maybank Fertilizer Co., Exchange Bldg., has work underway on the construction of a fertilizer plant to replace fire loss. Simmons-Mayrant Co. is contractor. Estimated cost $60,000.

S. C. Gaffney—Victor Cotton Oil Co., J. N. Lipscomb, Pres., plans to establish a plant for the manufacture of fertilizer.

Tenn., Chattanooga—Crane Enamelware Co., 1316 Chestnut St., plans the construction of a foundry and grinding building. Estimated cost $200,000. Equipment will be installed.

Va., Alexandria—Bryant Fertilizer Co., A. H. Bryant, plans to rebuild plant destroyed by fire. Loss is estimated at $150,000.

Middle West

Ill., Chicago—Viscosity Oil Co., 1101 West 37th St., awarded contract for the construction of a 2 story plant for the manufacture of soap greases to replace fire loss to George L. Arquette & Co., 160 North La Salle St.

Ind., Anderson—National Tile Co., 26th and Pitt Sts. awarded contract for the construction of a 1 story, 75 x 310 ft. plant on East 26th St. to Eshelman & Sons, 718 Jackson St. $72,000.

Mich., Adrian—City plans the construction of a sewage treatment plant including sludge drying beds. Hoad, Decker, Shoecraft & Drury, Ann Arbor, are engineers.

Mich., Iron Mountain—Iron Mountain Gas Co., W. Clausen, mgr., is receiving bids for the construction of a gas plant including water gas set. Estimated cost $125,000. Private plans.

O., Akron—Firestone Tire & Rubber Co., 1289 South Main St., awarded contract for the construction of a 3 story, 200 x 400 ft. warehouse to H. P. Moran Construction Co., Terminal Bldg., Cleveland. Estimated cost $250,000.

O., Barberton—Seiberling Rubber Co., plans the construction of a 1 story, 150 x 240 ft. addition to factory to increase capacity of plant 50 per cent. Estimated cost $200,000.

O., Cleveland—The Chisholm-Moore Co., 4556 Lakeside Ave., awarded contract for the construction of a 1 story, 54 x 63 ft. annealing plant to Griffin Construction Co., 5511 Euclid Ave. Estimated cost $40,000.

O., Cleveland—Diamond Bronze Co., 5415 Brow Ave., awarded contract for the construction of a 1 story, 60 x 125 ft. plant on Sideway Ave. to Vulcan Construction Co., 6600 Park Ave. Estimated cost $40,000.

O., Cleveland—The Dust Recovering & Conveying Co., 2130 St. Clair Ave., awarded contract for the construction of a 40 x 60 and 90 x 150 ft. factory and office building to H. K. Ferguson, 4900 Euclid Ave. A research laboratory will be installed in plant.

O., Cleveland—Vitrolite Co., C. A. Myers, Pres., 2907 Detroit Ave., white tile manufacturers, is having plans prepared for the construction of a 3 story, 44 x 80 ft. factory at 2909 Detroit Ave. Estimated cost $50,000. A. B. Sylvanus, 6014 Euclid Ave., is architect.

O., Columbus—Brunt Tile & Porcelain Co., J. M. Morton, Gen. Mgr., Closeland St., is in the market for one automatic dripping machine for wall tile manufacturing.

O., Springfield—Willenberg College R. E. Tuttloff, Pres., is having plans prepared for the construtcion of a 2 story, 32 x 140 ft. laboratory. Estimated cost $160,000. R. E. Gotwald, 310 M. & M. Bldg., is architect.

O., Youngstown—Pennsylvania Rubber & Supply Co., 29-33 East Front St., has had plans prepared for the construction of a 1 story, 60 x 190 ft. sales and service building on Woodland Ave. Estimated cost $150,000. G. S. Rider & Co., Century Bldg., Cleveland, is architect.

Wis., Two Rivers—Wisconsin Public Service Co., 559 Marshall St., Milwaukee, has been granted a franchise for a gas plant here.

West of Mississippi

Ark., Little Rock—Arkansas Fertilizer Co., 2200 East North St., Little Rock, has work underway on the construction of a plant. Estimated cost $50,000.

Ia., Iowa City—State Bd. of Education, W. H. Gemmill, Secy., Des Moines, is receiving bids for the construction of a 4 story addition to state university including a chemistry building. Proudfoot, Rawson & Souers, 810 Hubbell Bldg., Des Moines, are architects. Former bids rejected.

Mo., Joplin—Wilhoit Refinery Co., Villa Heights, plans improvements to plant. Estimated cost $150,000. Equipment including 1,000 lb. daily capacity pressure still, four 2,000 bbl. storage tanks, two 5,000 lb. storage tanks, boilers, etc. will be required.

Mo., Kansas City—Suvall Paint & Gloss Co., is having plans prepared for the construction of a 3 story, 60 x 72 ft. factory building and warehouse. Estimated cost $60,000. Holt, Price & Barnes, 8000 Davidson Bldg., are architects.

Mo., St. Louis—Barton Mfg. Co., Waco, Tex., plans the construction of a 2 story shoe polish factory at Brown St. and Kings Highway, here. Estimated cost $100,000.

Okla., Bartlesville — Phillips Petroleum Co., has had plans prepared for the construction of a 7 story, 65 x 140 ft. office building. Estimated cost $500,000.

Okla., Cromwell—Sinclair Oil & Gas Co., Sinclair Bldg., Tulsa, will build an 8 unit absorption type gasoline plant here by force account. Estimated cost $650,000. W. Baker is construction superintendent and L. C. Van Cleve is resident construction superintendent.

Okla., Tulsa—Sand Springs Cotton Mills, Sand Springs, plans the construction of a bleaching plant including the installation of a 75,000 raw fibre drying plant, here. Estimated cost $350,000.

Tex., Amarillo—Amarillo Refining Co., D. Carter and P. S. Allen, owners, plans addition to refinery to increase daily capacity 5,000 bbls.

Tex., Pecos—B. Hester, has had plans prepared for the construction of a cotton compress and fumigation plant. Estimated cost $60,000.

Far West

California—Standard Sanitary Mfg. Co., 1000 Bryant St., San Francisco, is having preliminary plans prepared for the construction of a plant for the manufacture of plumbing goods. Estimated cost $1,000,000. Location not determined. Company engineers in charge.

Calif., Anaheim—Crystal Chemical Co., plans to expend $75,000 for plant to convert waste matter into fertilizer.

Calif., Oakland—National Lead Co., 47th Ave. and East 10th St., awarded contract for the construction of a 3 story plant on East 10th St. to Barrett & Hilp, 918 Harrison St. $24,000.

Calif., Patterson—F. H. Roberts, Mutual Creamery Co., plans the construction of a 1 story, 28 x 100 ft. casein plant.

Calif., San Francisco—California Bleaching Water Co., 2201 Chestnut St., awarded contract for the construction of a 1 story plant at Richard and Barnevald Sts. to Ash & Hand, 1728 Mission St. $18,500.

Calif., Sacramento—K. C. B. Electric Mfg. Co., 14th Ave. and 42d St., plans the construction of a plant for the manufacture of storage batteries. Estimated cost $10,000.

Ore., St. Helens—Hawley Pulp & Paper Co., W. P. Hawley, Pres., Oregon City, plans the construction of a paper mill at Columbia River here. Estimated cost $1,000,000. Engineer and architect not appointed. Owner is in the market for all machinery and equipment also structural steel, cement, etc. for construction of the mill.

Wash., Seattle—The Calpet Refining Co., a subsidiary of the California Petroleum Corp., Los Angeles, Cal., has been organized and plans the construction of an oil refining plant here. Estimated cost $500,000.

Canada

B. C., Powell River—Powell River Co., Ltd., awarded contract for the construction of a 2 story, 150 x 450 ft. machine roof and a 1 story, 100 x 100 ft. screen room for paper mill, to Armstrong, Morrison & Co., 643 Granville St., Vancouver, $40,000. Owner will purchase a paper machine.

Man., Fort Alexander—The Spanish River Pulp & Paper Co., in conjunction with J. D. McArthur interests, plans the construction of a 200 ton paper mill here. Estimated cost $4,500,000.

Ont., Iroquois Falls—Abitibi Power & Paper Co., plans the installation of electric boilers and 2 or 3 newsprint machines to increase capacity of paper mill.

Ont., Listowel—City Dairy Co., Spadina Crescent, Toronto, awarded general contract for the construction of a milk powder and condensed milk plant here to Britnell Contracting Co., Baxter St., Toronto. Estimated total cost $75,000. Owners will purchase and install equipment later.

Ont., London—Bd. of Education, S. F. Lawrason, Chn., will soon receive bids for the construction of a 2 story, 90 x 185 ft. collegiate building including physics and chemistry laboratories on East London St. Estimated cost $300,000. L. E. Carrothers, Board of Education Bldg., is architect.

Ont., Niagara Falls—Onedia Community Silver Co., awarded contract for the construction of addition to plant for the manufacture of silverware to Piggott Healey Construction Co., 36 James St. South, Hamilton. Estimated cost $100,000. Additional equipment will be required.

Que., Montreal—Spencer Kellogg Co., 1351 North Branch St., has had plans prepared for the construction of a linseed oil refining plant on the water front here. Estimated cost $250,000.

Que., Quebec—Anglo Canadian Pulp & Paper Co., F. W. Clarke, Pres., has had plans prepared for the construction of a pulp and paper mill of 4 units on Limoilon St. Estimated cost $15,000,000. G. F. Hardy, 309 Broadway, New York, is engineer.

Incorporations

The J. M. Delaney Co., Meriden, Conn., leather, $50,000. J. M. Delaney, A. L. Delaney, J. T. Vosper.

Pondosa By-Products Corporation, Dover, Del., $200,000, products from the destructive distillation of wood, etc.

American Bamberg Corporation, Wilmington, Del., manufacture and dye artificial silk thread, $17,500,000, 35,000 shares preferred, $100 per share, $3,500,000 and 14,000 common, no par. (Corporation Trust Co., of America, Dover, Del.)

Ranson Paper Co., Dover, Del., $100,000, manufactures. G. Chismar, W. Brewster, Kingston, Pa., J. A. McNey, Ranson, Pa. (Capital Trust Co. of Delaware, Dover, Del.)

The James Dictarian Corporation, Dover, Del., $250,000, manufacture "Haynes Chocolate Malted Milk."

The Hodson Corporation, Dover, Del., $50,000, manufacture, lubricating and waterproofing materials.

Wonder Products Co., Inc., Dover, Del., $50,000, manufacture and sell preparation for cleaning automobiles.

Colorado Fluorspar Corporation, Dover, Del., increase capital $700,000 to $1,025,000.

Kohler Co., Wilmington, Del., $1,000,000, porcelain plumbing. (Corporation Trust Co. of America.)

Electropure Sales Corporation, Wilmington, Del., $150,000, purification of liquids. (Delaware Regn. Trust Co.)

Dowington Chemical Co., Wilmington, Del., $100,000, rags, wood pulp (C. G. Guyer, Wilmington, Del.)

Ford Rubber Co., Dover, Del., increase capital from $100,000 to $5,000,000; Potomac Electric Appliance Co., $100,000 to $1,000,000.

Gish Rubber Co., Wilmington, Del., automobile accessories, $50,000. (Corporation Service Co.)

Lessac Resof Co., Wilmington, Del., petroleum, $330,000. (Corporation Trust Co. of America.)

W. D. Crossman Co., Concord, Mass., cleaning liquids, 1,000 shares no par value stock. W. D. Crossman, Roxbury, Mass., T. Hollis, Jr., Concord Junction, Mass., J. P. Carr, Winchester, Mass.

Ruth & Co., Inc., Boston, Mass. $20,000 paints, F. Ruth, Sharon, Mass., H. O. Barron, Roxbury, Mass., E. Wirin, Dorchester, Mass.

Candus Laboratories, Inc., Cambridge, Mass., $25,000, manufacture of extracts. F. N. Raman, R. Stashie, W. Ireland, Arlington, Mass.

National Tire Co., Brockton, Mass., $100,000, automobile tires. M. Stone, J. Cohen, A. L. Kolonel, F. Stone, Dorchester, Mass.

Pittsfield Oil Co., Pittsfield, Mass., $125,000, oils. C. L. Norton, R. C. Lacy, Catskill, N. Y., L. Dalamater, Hudson, N. Y.

National Pyrotechnic Corporation, Boston, Mass., $100,000. G. F. McDuffie, Winthrop, Mass., W. O. MacArthur, B. and P. H. Glynn, Boston, Mass.

Trimont Oil Co., Boston, Mass., oils; $100,000. J. J. Glavin, Boston, T. F. O'Connell, Southboro, E. H. Borofski, Lynn, Mass.

The George B. Robbins Disinfectant Co., Boston, Mass., disinfectants; $9,600. J. I. Ralston, G. P. Robbins, 379 Concord St., Framington, Mass.

Allied Asphalt & Mineral Corp., New York, N. Y., industrial compounds, $100,000. H. W. Paprocki, C. J. Ferris, H. B. Holland. (Atty., J. H. Lecour, 18 Vesey St., New York.)

Dunlop Tire & Rubber Corp., New York, N. Y., 260,000 to 260,690 shares of which 690 are 8 per cent cum. preferred and 60,000 2nd pfd. $100 each 200,000 common, no par.

Levant Castile Soap Corporation, New York, N. Y., 100 shares $10 each to 100 shares $100 each, 100 common no par, same as heretofore.

Salt City Shellac & Chemical Corporation, Rochester, N. Y., $20,000 cements, oils, toilet articles etc. P. Fleischmann, 176 Fellows Ave., H. Milentz, 1213 Butternut St., M. Fleischmann, 176 Fellows Ave.

Ontario Paper Mills., Shortsville, N. Y., $100,000. G. W. Bennett, A. T. Jones, M. D. Nutting. (Atty. G. S. Tinklepaugh, Palmya, N. Y.)

General Color Co., Newark, N. J., manufacture paints, etc. $20,000. L. A. Altenberg, Newark, M. J. Shapiro, J. Shapiro, Brooklyn, N. Y. (Atty. Corporation Trust Co., Jersey City, N. J.)

L. B. Simonds & Co. Inc., Hoboken, N. J., manufacturing artificial silk, $50,000. R. F. Kane, New York, N. Y., E. C. Barton, F. G. Langer, Brooklyn, N. Y. (Attorneys Cady, Schapiro & Schapiro, New York, N. Y.)

Spill Manufacturing Co., East Rutherford, N. J., celluloid novelties, $75,000. F. Spill, East Rutherford, N. J., W. J. Parfrey, M. Becker, New York, N. Y. (Attorney J. W. Miller, Rutherford, N. J.)

Newark Varnish Works, Newark, N. J. $100,000, varnish, 2,000 shares, no par. E. R. Colburn, R. Schroeder, Newark, N. J., H. C. Zink, Belleville, N. J. (Attys., Porter, Zink & Lafferty, Newark, N. J.)

Hard Rubber Punched Goods Co., Montclair, N. J., $100,000, rubber goods. H. W. Trimble, Montclair, N. J.

Town Tire Co., Newark, N. J., $125,000. J. A. Fitzgibbons, Jersey City, N. J., J. J. Kennedy, N. Kennedy, New York, N. Y. (Attorney B. A. Reilly, Newark, N. J.)

Petroleum Gasifier Corporation, Jersey City, N. J., petroleum products, $125,000.

Eagle Liquid Gas & Oil Co., Cincinnati, O., $100,000. J. Hilberg, Jr., H. E. and N. E. Deckebach, A. A. Deoebach, M. Hilberg, Cincinnati, O.

Gas Industries Co., Pittsburgh, Pa., manufacture, and sell gases and other chemicals, etc. $5,000. E. G. Mueller, A. T. C. Gordon, Pittsburgh, Pa., W. Booth, Sewickley, Pa.

Reynoldsville Lime Co., Reynoldsville, Pa., $20,000, manufacture limestone and fire clay. L. B. Johnston, Reynoldsville, Pa., W. T. Gross, Falls Creek, S. M. McCreight, Reynoldsville, Pa.

National Gasoline Co., Titusville, Pa., $5,000, refining, manufacturing, buying and selling gasoline. W. E. Fertig, C. C. Hogg, Titusville, Pa., G. C. Dolphin, Oil City.

North Penn Refining Co., Tiona, Pa., $100,000, manufacture refined oils and other products from petroleum. L. C. Wright, Bradford, Pa., G. M. Wykoff, Clarendon, Pa., D. H. Culbertson, Warren, Pa.

Vitale-Compton Fireworks Mfg. Co., New Castle, Pa., $20,000, manufacturing spectacular and scenic fireworks. T. Vitale, J. C. Compton, J. Vitale, New Castle, Pa.

A. K. Purdy, E. M. Pringle, et al., dehydrating plant, $75,000.

Gatesville Cotton Oil Mill, Inc., Gatesville, Tex., $50,000. F. F. Wier, J. A. Hallman, Gatesville, Tex.

Inland Petroleum Corporation, Spokane, Wash., $50,000 W. E. Seymour, A. L. Gridley, H. V. Wilson.

Champion Fuelizer Corporation, Ltd., $100,000, Montreal, Que.

Hoboken Putty & Cement Works, Inc., Hoboken, N. J., putty, $50,000. W. H. Wack, New York, N. Y.

Eastern Paper & Felt Mills., St. Basile, Portneuf, Que. $99,000.

CHEMICAL & METALLURGICAL ENGINEERING

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A PAGEANT OF PROGRESS

MECHANICAL equipment and mass production are the dominant characteristics of American industry. The two are cause and effect in the marvelous industrial transformation that has been witnessed in this country within the proverbial span of life. In this development engineering has gone hand in hand with increased production and has been mainly responsible for it. Chemical engineering has made its imprint only within the last score of years, yet so swift is the pace of recent progress that the next ten will see a veritable revolution in some industries and in the general use of products now known to few.

IN all this transformation the rôle of mechanical equipment is unquestionably the most spectacular feature. The mechanization of industry has increased the production of goods, reduced their cost and broadened their consumption. It has effected uniformly high quality as well as increased quantity in production. It has raised our standard of living and promoted our national prosperity to a degree enjoyed by no other people. Labor has been released from toilsome drudgery to more remunerative work, and all have shared the benefits of inventive skill.

WHAT is the measure of this progress in the mechanization of industry and how can it be visualized? Obviously by comparison with the past. A Chinese proverb tells us that one picture is worth a thousand words. Hence pictorial comparison of modern industrial equipment with primitive manual methods or early mechanical processes gives the most striking evidence of our present advanced position.

IN the following pages *Chem. & Met.* presents a pageant of progress in some of the chemical engineering industries and unit operations, contrasting early and recent practice. The historical periods vary with the ages of the different industries. In some cases the contrast between the old and the new is not so much a measure of time as of current industrial conditions among the different peoples of the world. But whether ancient or recent and primitive, the contrast always emphasizes the capacity and efficiency of chemical engineering equipment.

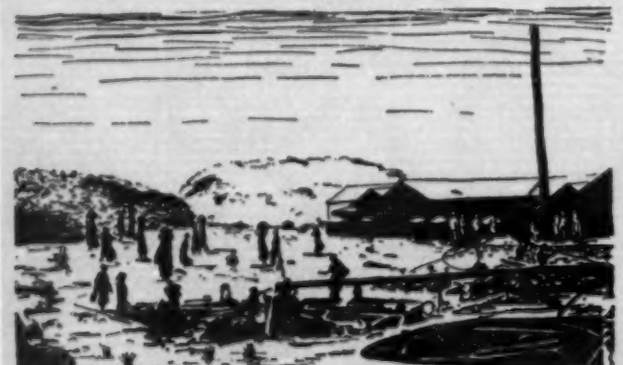
IT is worth remembering that this happy position of American industry is the product of highly competitive conditions where individual initiative finds free play and an opportunity to reap reward commensurate with its contribution to the general welfare. Such a condition could not exist where personal endeavor is stifled or where human wants are neither created nor satisfied. It is only where genius is encouraged and ambition can be gratified that industry reaches its highest levels of progress. In American chemical engineering industries mechanical equipment is at once the cause and effect of much of our prosperity and supremacy.

Thickening

¶ Primitive thickening in India, was accomplished by settling in pits and decanting the fluid

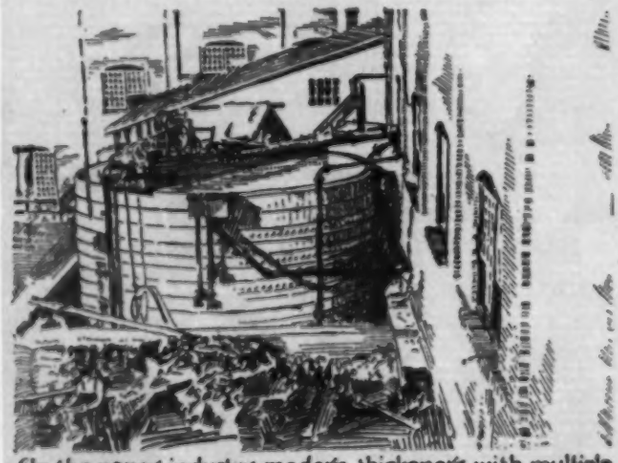
¶ Modern continuous thickeners as large as 200ft diameter will do the work of a thousand natives

¶ A simple man-power hoist raised the buckets to the discharge trough

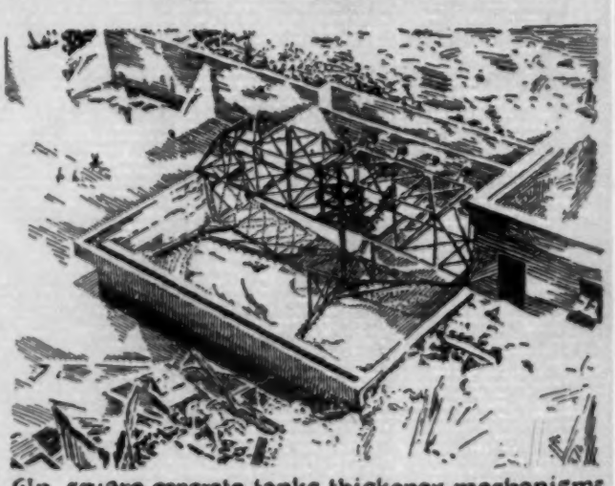


Sometimes natives with baskets carried the settled solid material out of the collectors

Series of decantation cones were an improvement over the more primitive processes

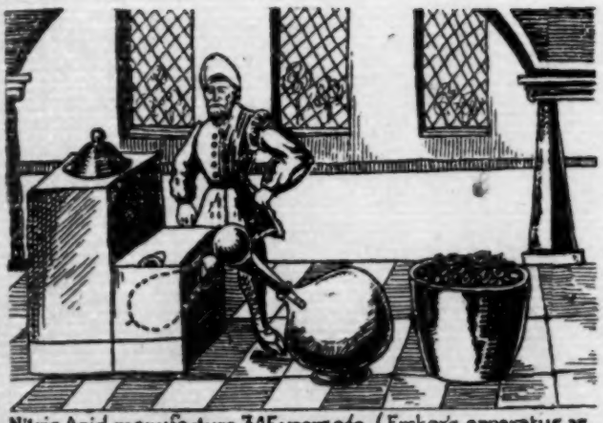


¶ In the paper industry modern thickeners with multiple trays are used to recover pulp from white water

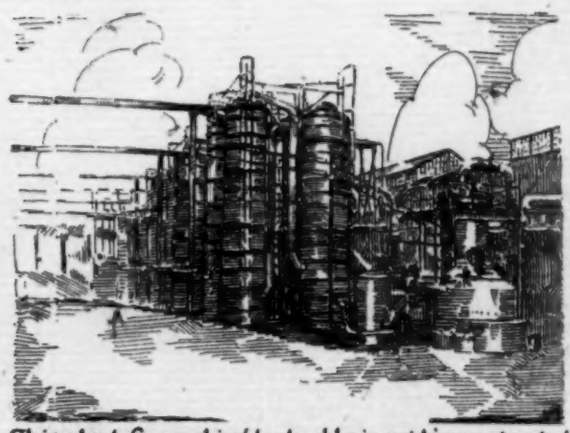


¶ In square concrete tanks thickener mechanisms are adapted to the handling of sewage

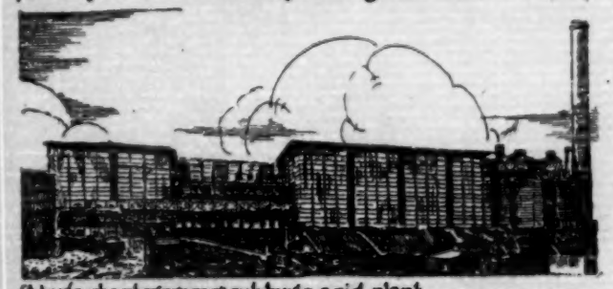
Acids



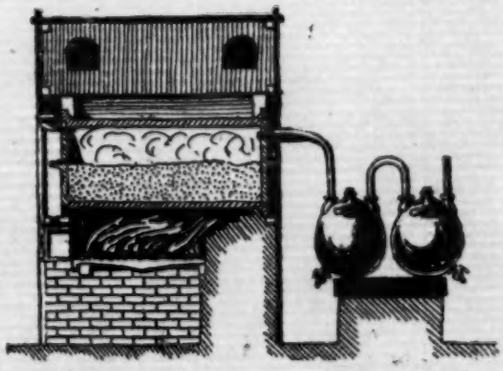
Nitric Acid manufacture 345 years ago. (Ercker's apparatus as opemted in 1580) Sulphuric Acid (oil of vitriol) was made in a similar apparatus by Basil Valentine in 1475 by distilling calcined copperas and silica



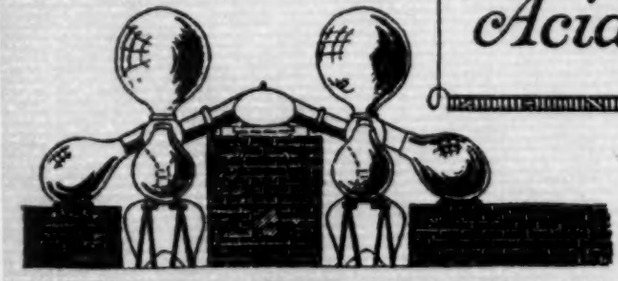
This plant for making hydrochloric acid is constructed entirely of stoneware. It marks an achievement in the ceramics industry also.



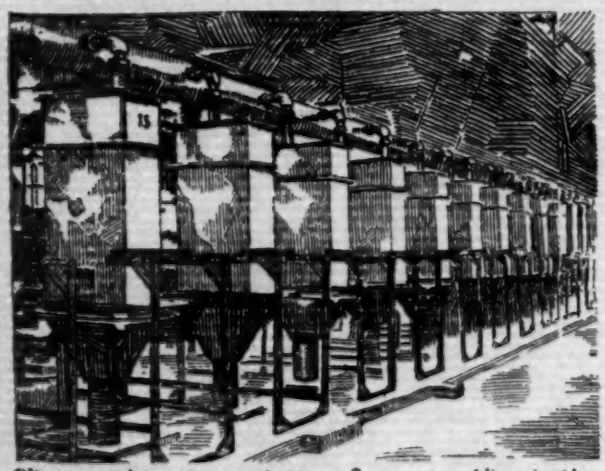
A huge chamber process sulphuric acid plant. This substance, once the plaything of alchemists, is now the backbone of chemical industry



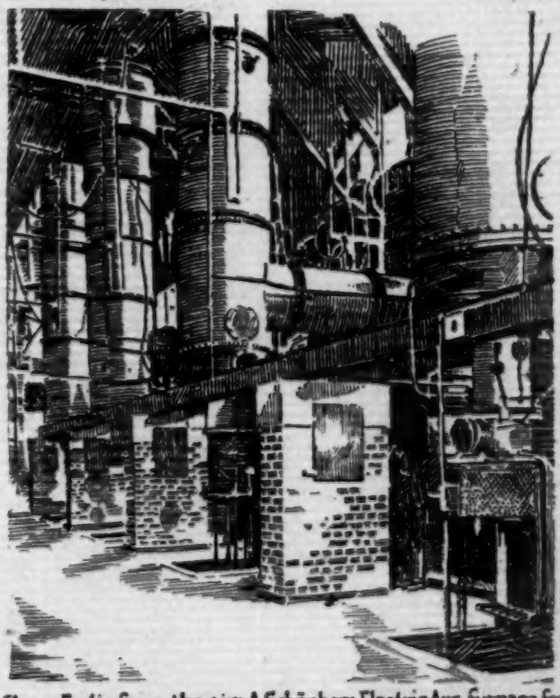
Making hydrochloric acid in cylindrical cast-iron retorts 50 years ago. The process is still used in a few plants.



Nitric Acid dates at least from 778 A.D. When Geber (the mythical scientist) prepared it by heating alum, blue vitriol and saltpeter. The retort shown herewith dates from 1771



Nitric acid by the oxidation of ammonia. View in the catalyzer house

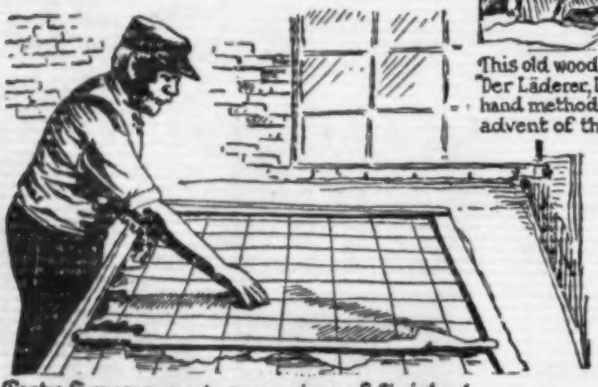


Aqua Fortis from the air: A Schönherr Electric Arc furnace for the oxidation of atmospheric nitrogen. A Norwegian installation which utilizes cheap hydro-electric power

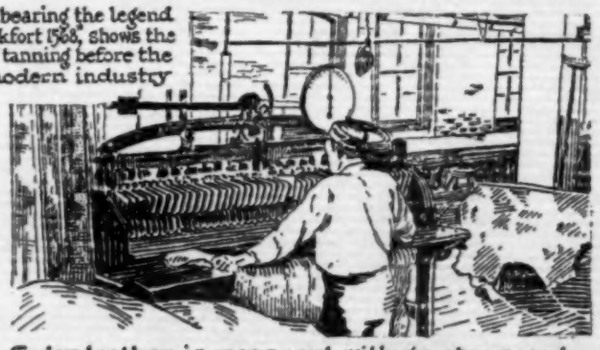
Tanning goes back to the early Egyptians. Beaming, shown at the left, finds its counterpart in the modern industry

This old wood cut, bearing the legend Der Läderer, Frankfort 1568, shows the hand methods of tanning before the advent of the modern industry

Beaming is no longer the drudgery it formerly was since machines accomplish all except the final removal of hair and dirt



Forty-five years ago every piece of finished leather was put under the measuring frame in order to count the squares that determined its value

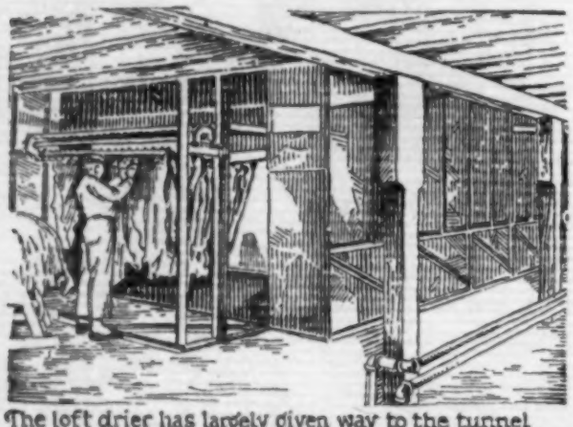


Today leather is measured with greater speed and accuracy in this modern measuring machine

Leather

In the older tanneries the tanned skins were nailed on boards or suspended from racks to dry in heated sheds or lofts

Various methods of dehairing and defleshing have been practised by primitive people yet there is none quite so crude or unappetizing as that employed by the Eskimo



The loft drier has largely given way to the tunnel drier, more satisfactory because of continuous operation and automatic control of temperature and humidity

A view of the rocker yard in one of the largest of the modern tanneries. The hides are handled here with an electric traveling crane

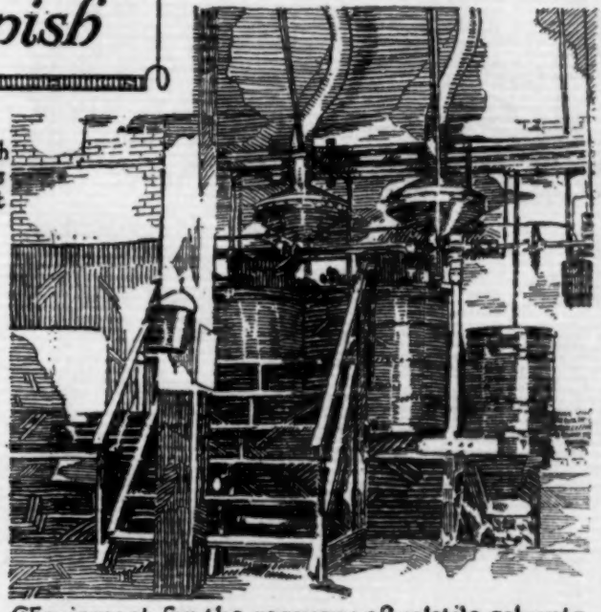
In the spring of 1827 ~ this first primitive varnish factory in an old apple orchard on Stuyvesant Farm at what is now ~ Sixth St and East River, New York City, was a center of curious interest to Indian and white man alike

Exterior of one unit of a modern stackless varnish plant showing type of construction made possible by the use of chemical engineering equipment for the recovery of fumes and solvent vapors

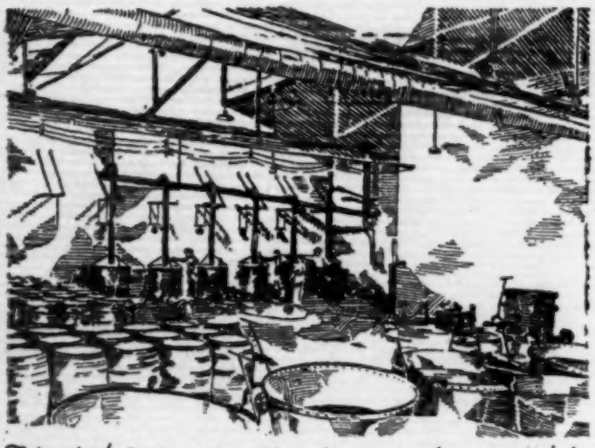
Paint and Varnish

Fireplace ~ in the oldest American Varnish chimney (from Sabin's "Technology of Paint and Varnish.")

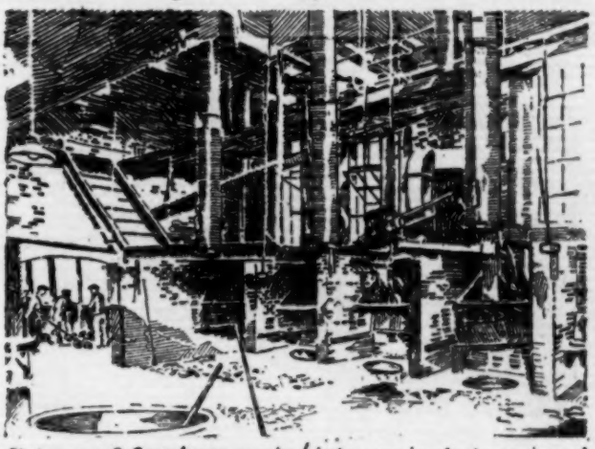
Varnish chimneys, yard and thinning down shed of one of the first varnish factories built in Detroit



Equipment for the recovery of volatile solvents vaporized during the thinning down of varnish products

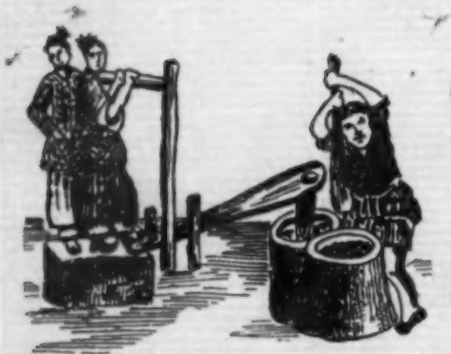


Thinning down operation in a modern varnish plant showing recovery equipment.

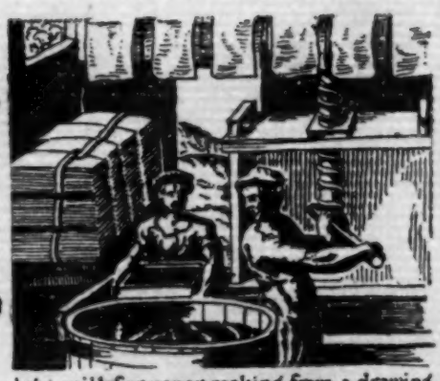


A type of fireplace coming into use in plants equipped with system of fume recovery

Pulp and Paper

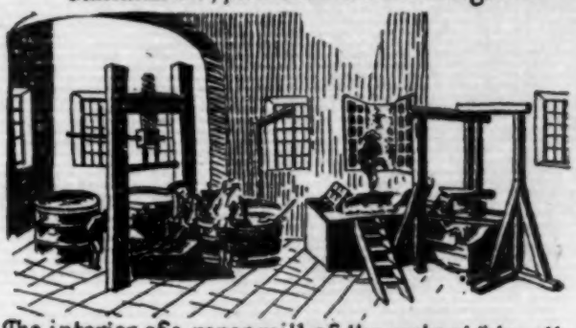


The Chinese were the world's first paper makers. According to Dard Hunter's unique work "Old Papermaking," this mortar was used by Ts'ai Lun (A.D.105), the inventor of vegetable fiber paper

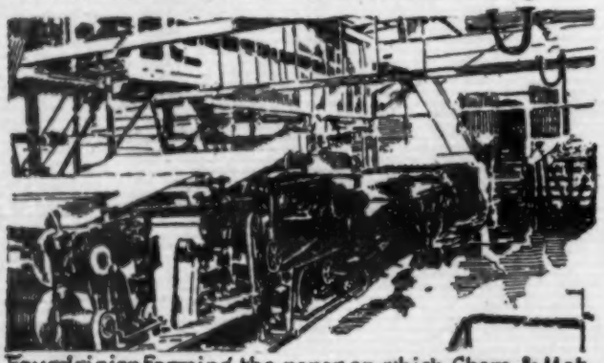


A complete mill for paper making from a drawing reproduced by Dard Hunter from "Theatrum Machinarum," published in Nuremberg, 1662

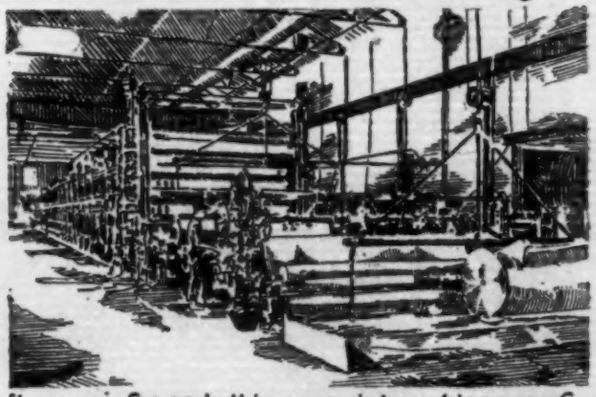
Water driven stamping mills soon displaced hand beating. Modifications of the mill shown here were used in Europe from the 12th to the 18th century



The interior of a paper mill of the early eighteenth century. Process and equipment had changed but little in five centuries of paper making

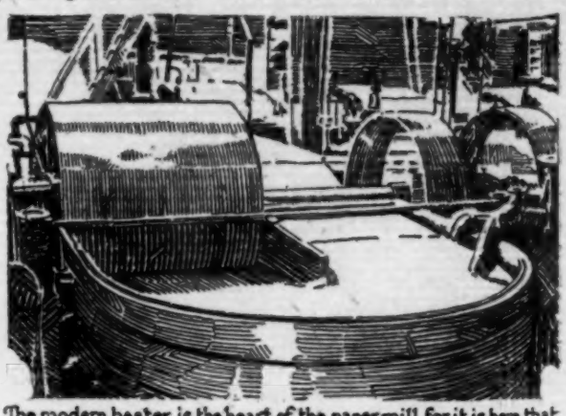


Fourdrinier forming the paper on which Chem. & Met. and the other McGraw-Hill publications are printed. These machines run at a speed of 350 ft. per minute on book paper

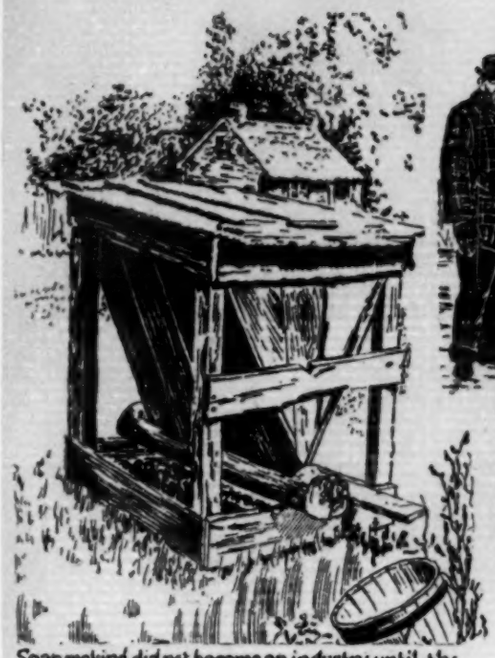


It seems a far cry to this newsprint machine, one of the fastest in the world. With a capacity of about 80 tons of paper a day it makes a sheet 146 in. wide at the rate of 1120 ft. a minute

Drying rolls on which the moisture content of the paper is reduced from over 95 per cent to less than 10. The calender is to be seen at the left



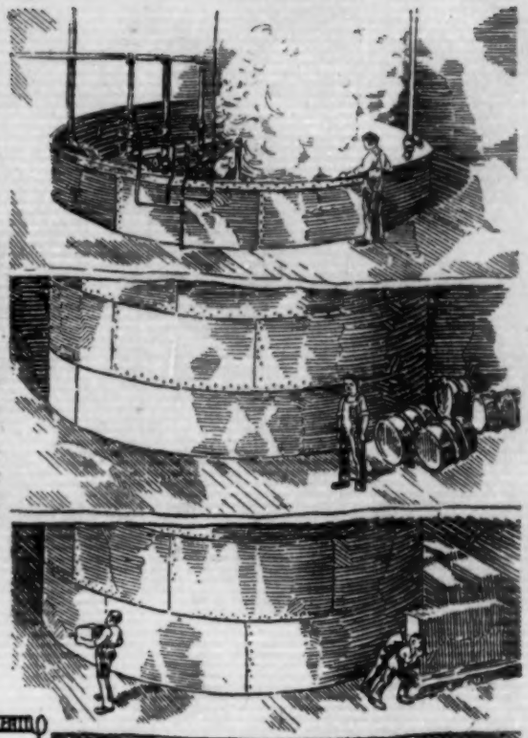
The modern beater is the heart of the paper mill for it is here that the mechanical rubbing and shearing action of the beater roll renders the pulp suitable for making a satisfactory sheet



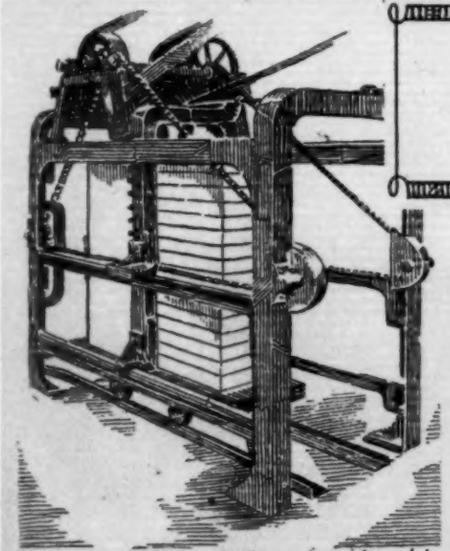
Soap making did not become an industry until the LeBlanc process had displaced such old time apparatus as this leacher for obtaining alkali from wood ashes

The farm yard kettle has disappeared from most parts of the country yet this citizen of Dayton, Tennessee apparently thinks that the old-fashioned methods are good enough for him

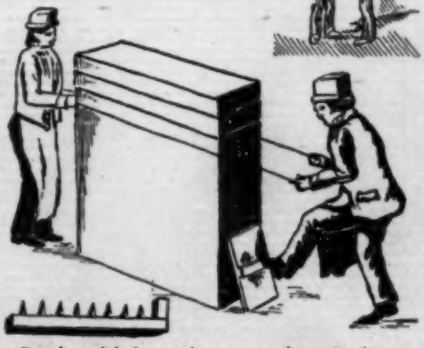
Soap



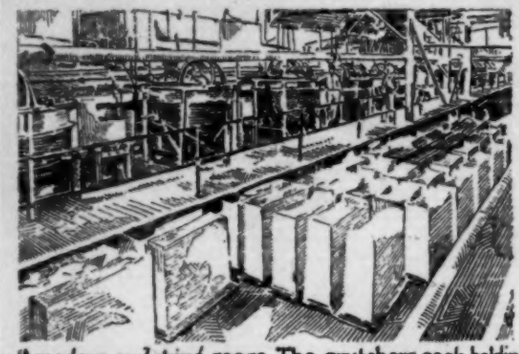
In striking contrast with the farmer's kettle is this great cast-iron or steel kettle, 30 ft. across and more than 40 ft. deep. The largest of these kettles holds 1,500,000 lb. of stock, enough to make 50 carloads of soap. To supply the necessary heat requires 1¼ miles of 2" steam pipe. To fill, boil and empty requires 14 days



Today the 1200 lb. block of soap is cut by a slabbing machine that draws wires through the soap and then delivers the slabs to the cutting tables



In the old days this was done by hand after the blocks had first been marked with the combing tool shown here.

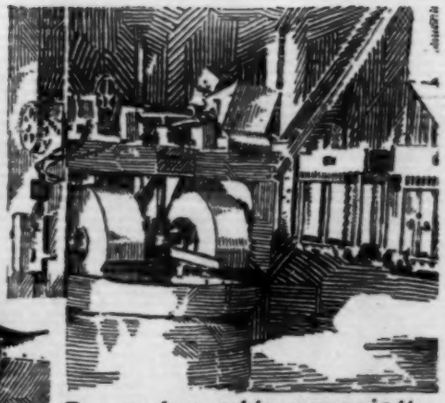


A modern crutching room. The crutchers, each holding about 1500 lb. of soap accomplish in a few minutes what in the old days required hours of arduous work

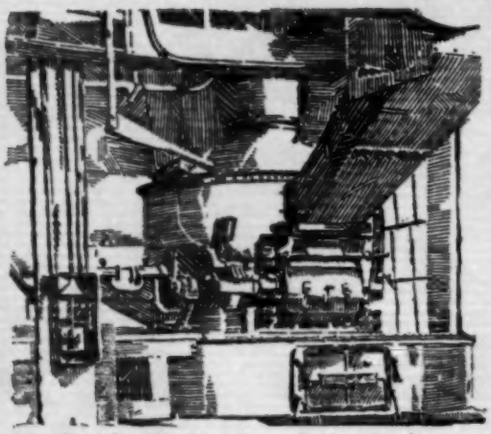
The top floor of the kettle house in one of the largest soap factories in the world. These kettles extend for three stories beneath the floor shown here.

Crushing and Grinding

Water-power grindstones of a primitive type like this were at one time almost universally used for grinding



The modern edge runner is the direct descendant of the old Italian and Spanish mills

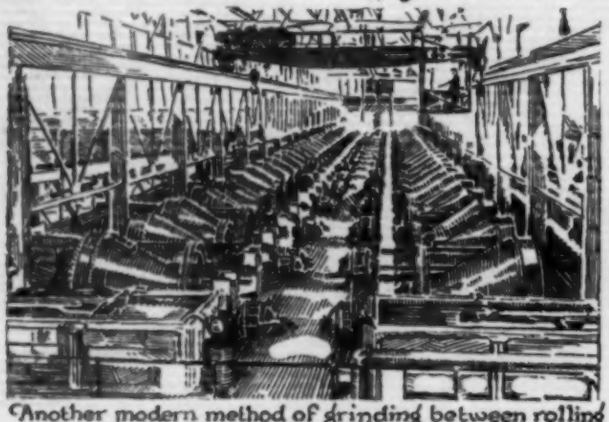


Much grinding is done today by impact mills of this and other types

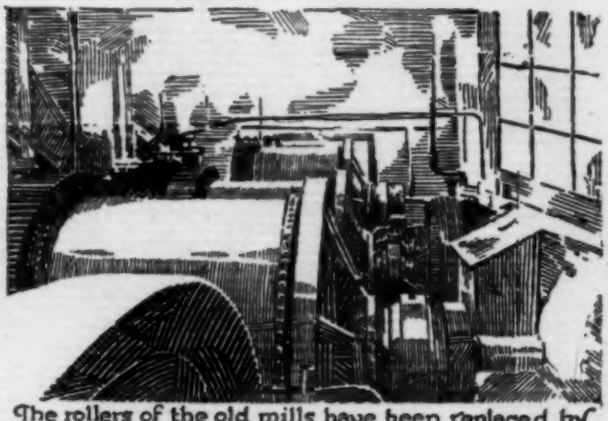
Old style Italian mill from which the modern Chilean mill developed

The modern adaptation of grinding between rolling surfaces is used for pigments

Roman millstones in a bakeshop of Ancient Pompeii



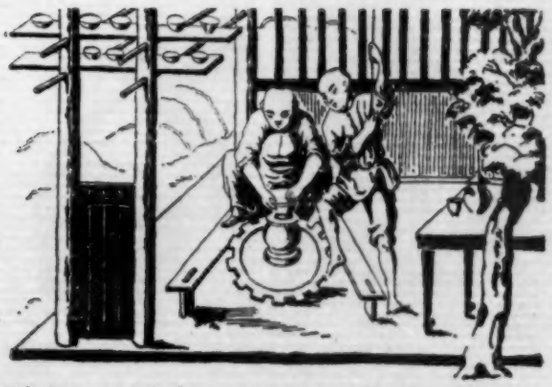
Another modern method of grinding between rolling surfaces is represented by these ball mills



The rollers of the old mills have been replaced by rolling rods within the cylinders of rod mills

Ceramics

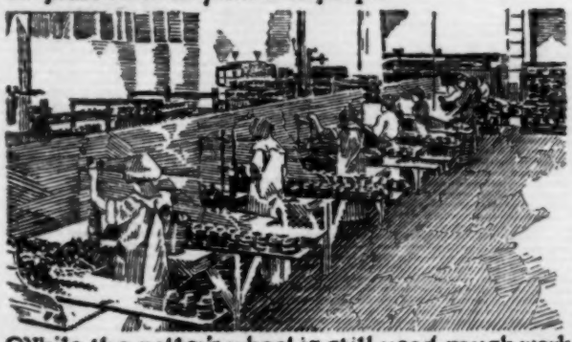
Egyptian kilns like these are typical of the early type used in most countries.



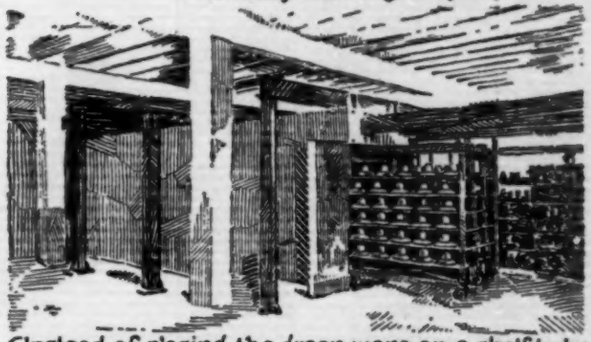
Primitive molding operations largely gave place to work done on such potter's wheel as this, the successors of which are still used. Note the drying method in upper left.

At first, ceramic wares were all molded by hand, this Chinese scene representing the practice of all primitive people

This Chinese porcelain kiln is an advance over the Egyptian type, but some kilns of today are not greatly superior.



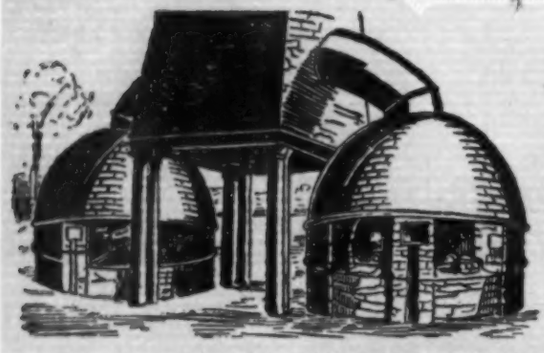
While the potter's wheel is still used, much work formerly done upon it is now handled by machines such as these



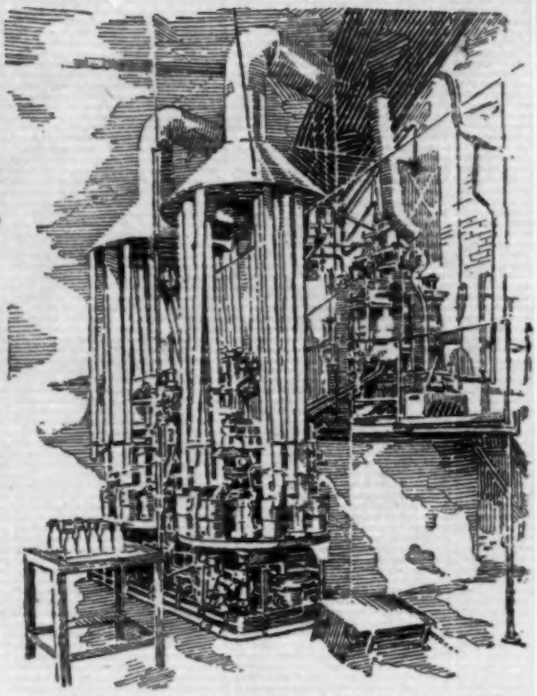
Instead of placing the green ware on a shelf to dry as shown above, modern plants use a tunnel drier and monorail cars like this.

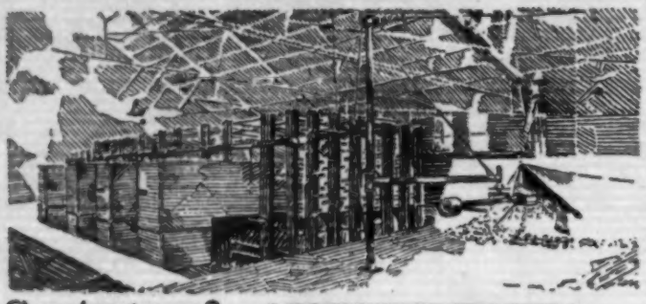
Molding operations are used today, but the modern plant generally looks something like this automatic refractory molding plant.

Most modern ware, of all types is, however, now fired in tunnel kilns of this or a similar type—



Glass materials were originally melted together in pots, placed in a direct fired furnace, of which this is an old example from the middle ages.





A modern type of glass furnace, called a "tank" in which glass is melted in bulk, here supplies glass machines by hand feeding

Glass

Bottles are now made by such automatic machines as this, fed automatically from a tank furnace by feeding machines.

Hand manufacture of plate glass as conducted about 150 years ago, is shown by this picture

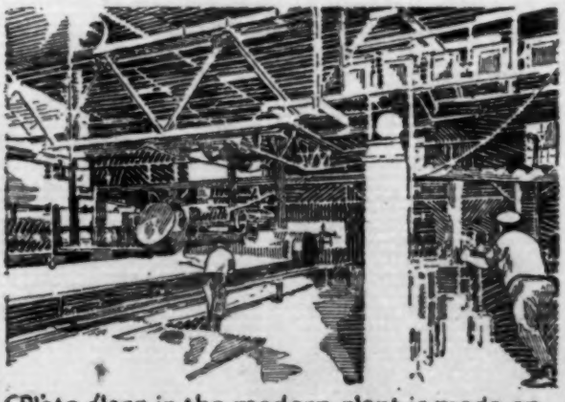
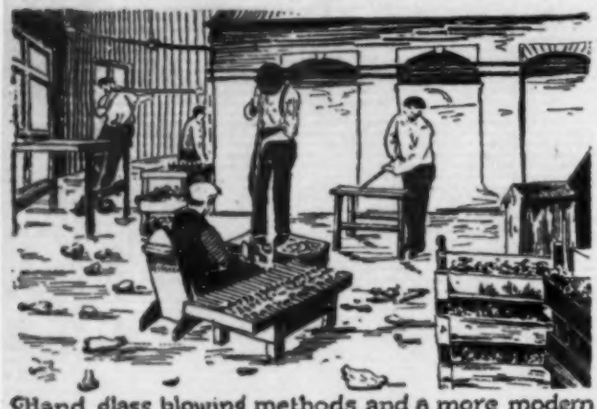
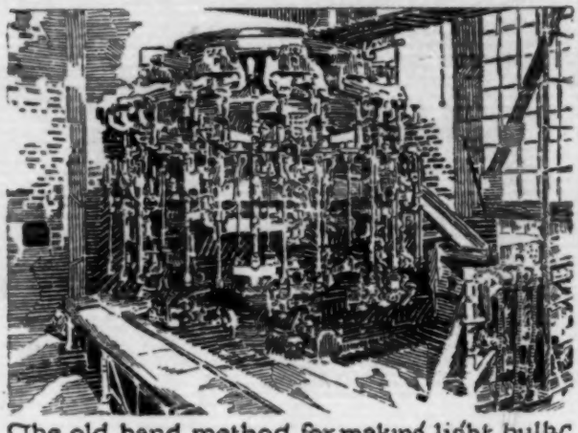


Plate glass in the modern plant is made on tables like this, supplied with glass by a ladle and crane from a nearby tank furnace



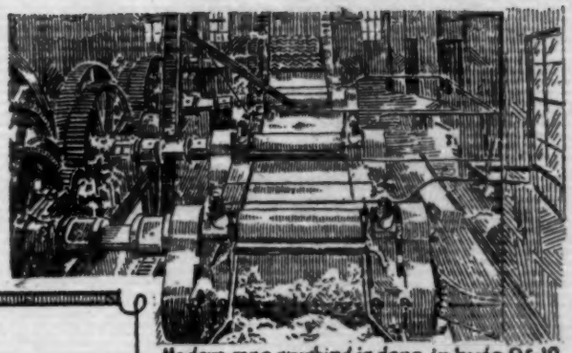
Hand glass blowing methods and a more modern type of pot furnace are shown in this scene in an early light bulb plant.



The old hand method for making light bulbs has been replaced by entirely new automatic machinery like this

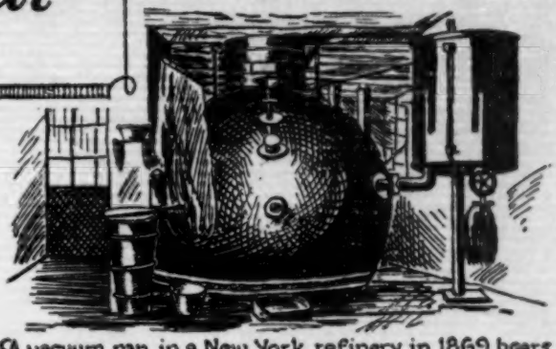
Sugar

Primitive cane crushing in the open fields yielded the juice from which raw sugar was made in the early days

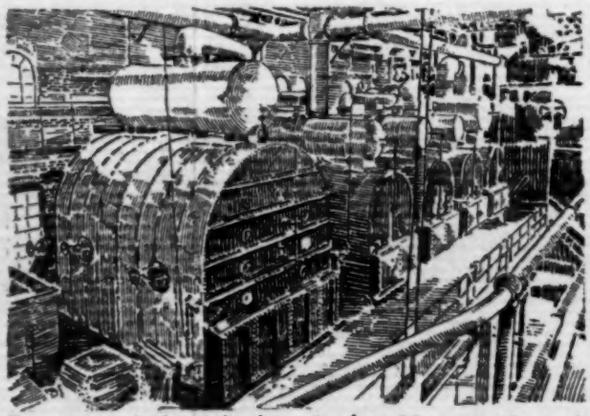


Modern cane crushing is done in huge 9-12 roller mills with primary corrugated crushers in marked contrast to primitive methods

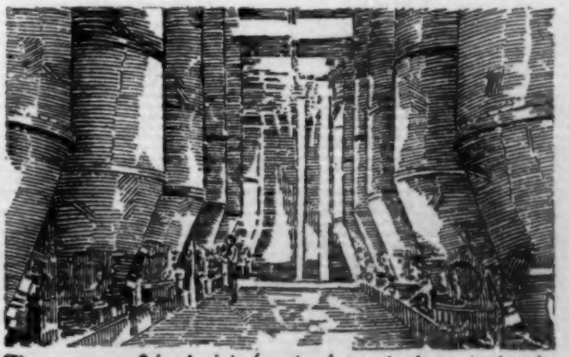
Evaporators of iron pans set in crude masonry over an open fire were the forerunners of the modern plants



A vacuum pan in a New York refinery in 1869 bears more resemblance to modern equipment

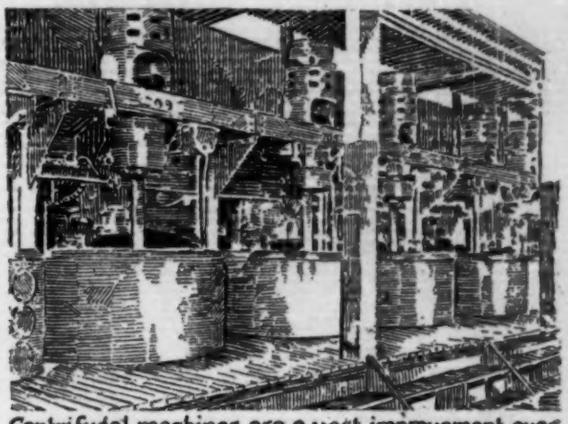


Evaporator stations also have developed in capacity and efficiency. The vacuum machine has superseded the open pan



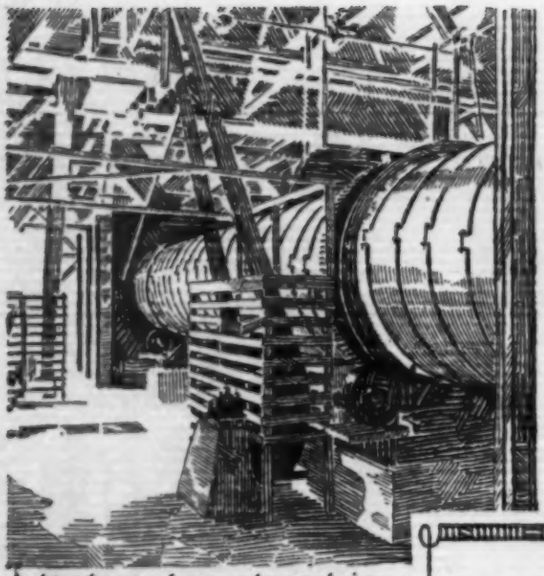
The process of decolorizing sugar juice is done in huge char filters holding 50 tons of char each

In China raw sugar is placed over bamboo sieves and covered with mud. Moisture trickles down through the sugar washing out molasses



Centrifugal machines are a vast improvement over earthen jars and mud baths for removing molasses

Drying

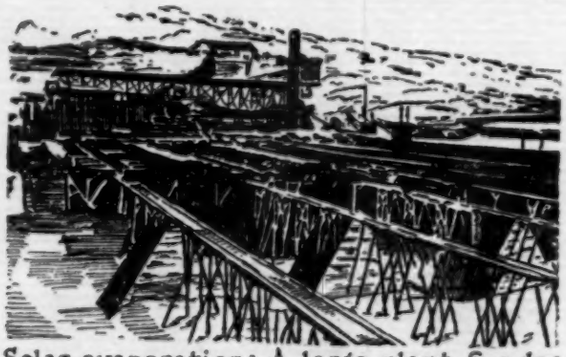


A large modern rotary drier: This one for potash crystals

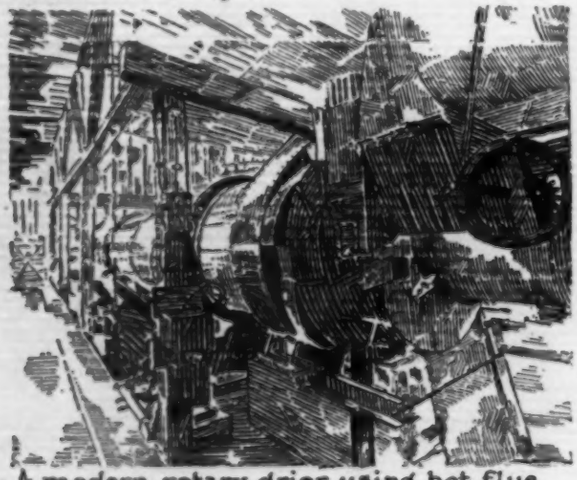
An open "loft" drier: Drying vegetable fiber in the tropics

A modern gas-fired kiln: This direct-fired kiln has tunnels 250 to 380 feet long and has extremely high thermal efficiency

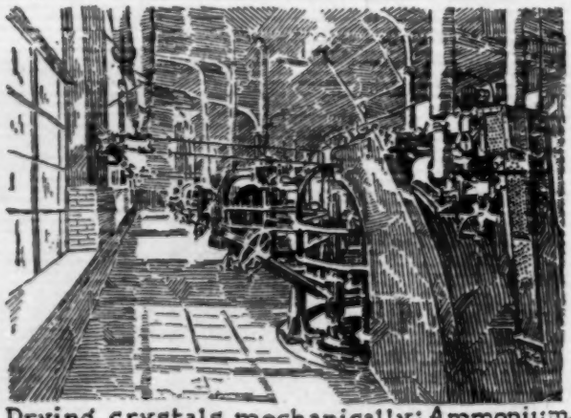
Drying diatomite in the open: An old method, utilizing solar heat, that is much used to this day



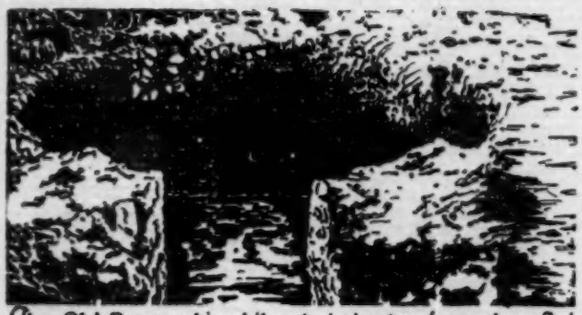
Solar evaporation: A large plant for drying salt in Western China



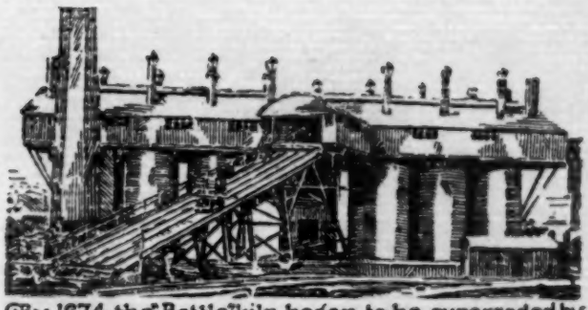
A modern rotary drier using hot flue gases in counter-current to the material, thus increasing thermal efficiency



Drying crystals mechanically: Ammonium sulphate carried to less than 2 per cent moisture in modern centrifugal machines

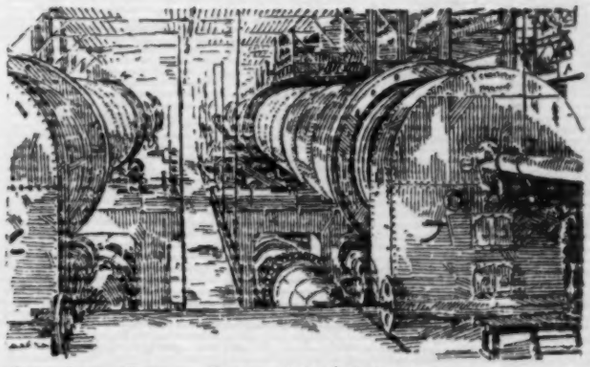


This Old Roman Limekiln, a hole in the ground, roofed and lined with stone, typifies the lime and cement industries up to a hundred years ago.



By 1874, the "Bottle" kiln began to be superseded by the shaft kiln which endured until comparatively recent times

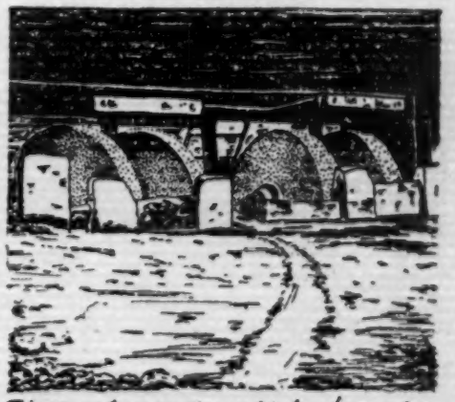
Next came the Chamber Kiln, used for both lime and cement, similar to the Roman Type, but above ground and easier to operate



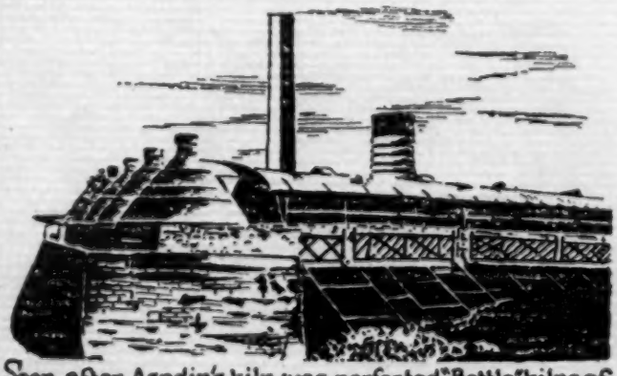
Modern Plants for making either Lime or Cement use rotary kilns like these

With the development of Portland Cement in 1824, the inventor Aspdin developed kilns like these.

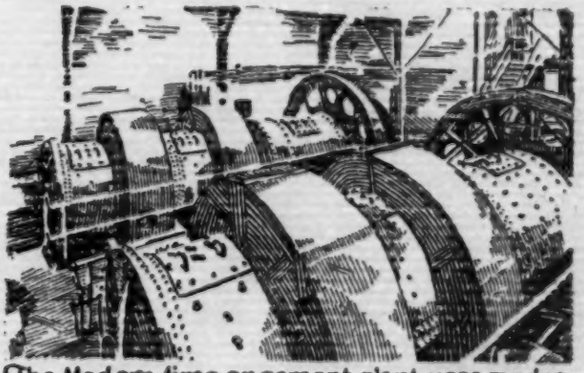
Lime and Cement



Lime and cement used to be ground in such old style edge runners as these.



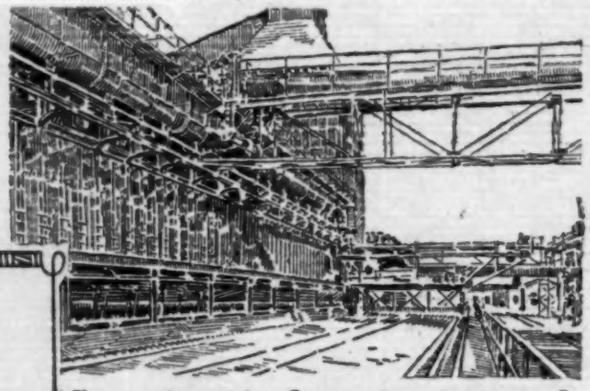
Soon after Aspdin's kiln was perfected "Bottle" kilns of the drying floor type appeared



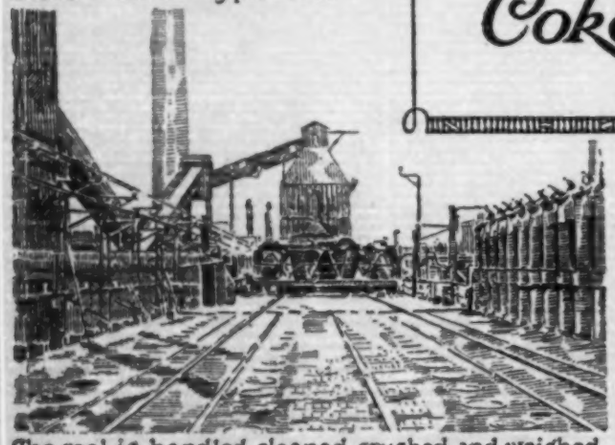
The Modern lime or cement plant uses modern mills of tube or impact type for grinding

Coke

The ruins shown in this picture are those of an early type of "beehive" coke oven, in which coal was carbonized with a loss of all the byproducts



The pusher side of a modern battery of byproduct coke ovens marks a sharp contrast with the "beehives"

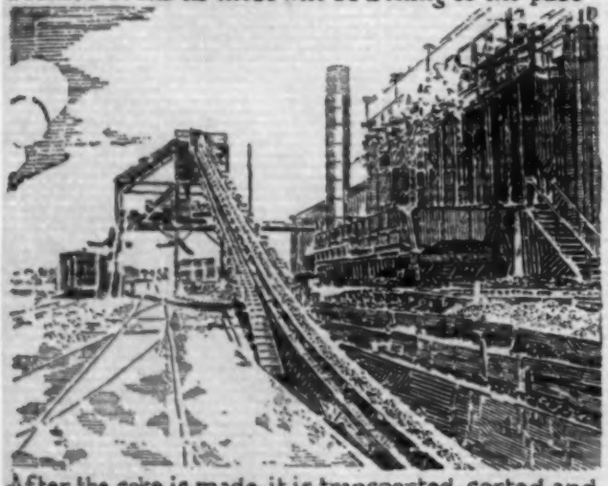


The coal is handled, cleaned, crushed and weighed automatically and is then charged into the ovens by an electrically-operated larry car

Some of the old types of beehive ovens are still operated at times of peak demand for coke

Byproduct coke output is rapidly catching up to coke demand and soon even such beehive ovens as these will be a thing of the past

Besides recovery of all the byproduct values of the coal, modern coke ovens are equipped with all possible labor saving devices



After the coke is made, it is transported, sorted and loaded into cars by electrically-operated machinery, a great contrast to the hand methods necessary with beehive ovens

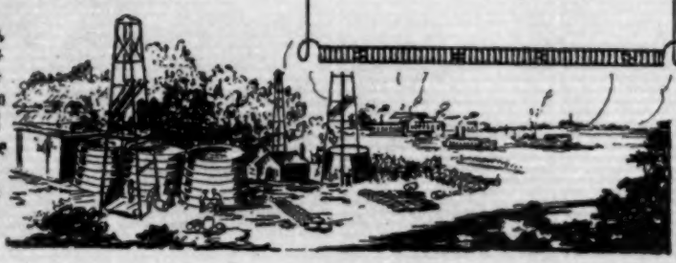
More modern types of beehive ovens are operated almost continuously, but their product returns but a low profit and their days are numbered

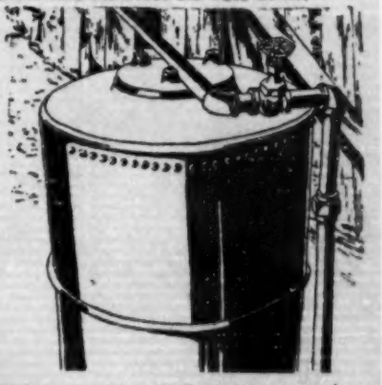
Petroleum

The first milestone of the petroleum industry was the famous Drake well near Titusville, Pa. There, on August 28, 1859, Colonel E. L. Drake drilled the first successful artesian oil well that changed petroleum from a drug store curiosity to a basic article of commerce

Sixty-five years later a tremendous industry had grown from this beginning. Over 300,000 wells were daily producing more than two million barrels of oil.

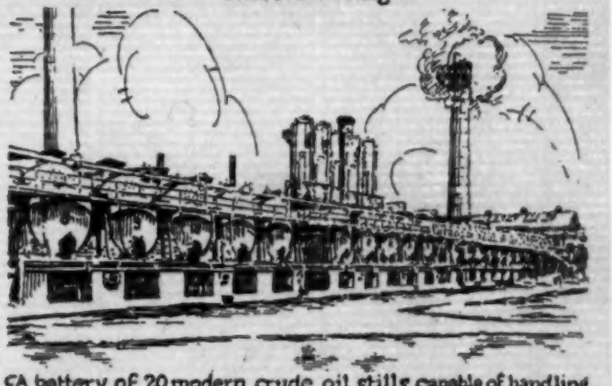
To Samuel M. Kier, a druggist of Pittsburgh, goes the credit for establishing in 1855 the first American petroleum refinery. He recovered oil from his father's brine well at Tarentum and distilled it to obtain a product with "wonderful medical virtues"



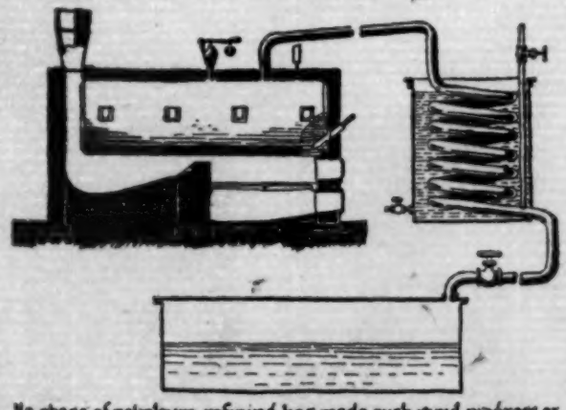


The first still used for refining petroleum in this country was 3'-7½" in diameter and 4'-8" in height

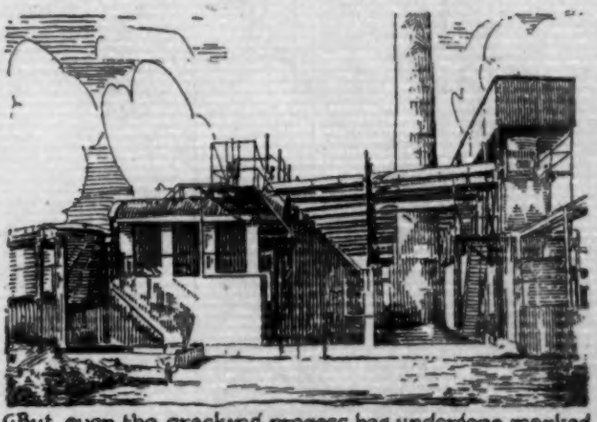
In striking contrast to the above is this 15,000 bbl. modern refinery in the mid-continent field equipped to produce a complete line of petroleum products



A battery of 20 modern crude oil stills capable of handling as much as 25,000 barrels of oil per day

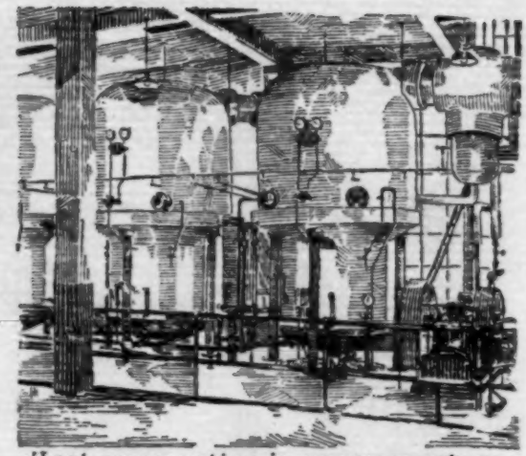


No phase of petroleum refining has made such rapid progress or had so great significance as the introduction of the cracking process. This diagram is that shown in the first of the Burton patents, issued Jan 7, 1913



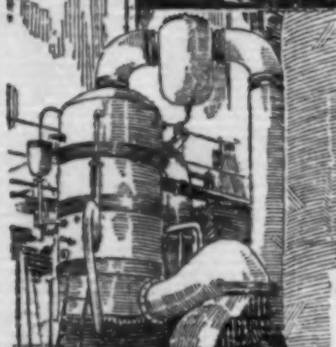
But even the cracking process has undergone marked changes as indicated by this battery of Burton cracking stills in a Kentucky refinery

Open-pan evaporators that have remained unchanged for many centuries: Concentrating brine in China



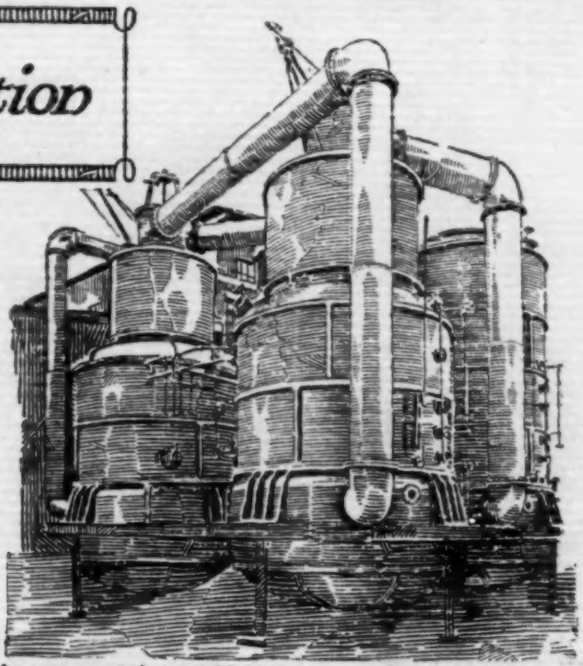
Heat conservation in an evaporator installation: Lagging on a large triple-effect evaporator

Evaporation

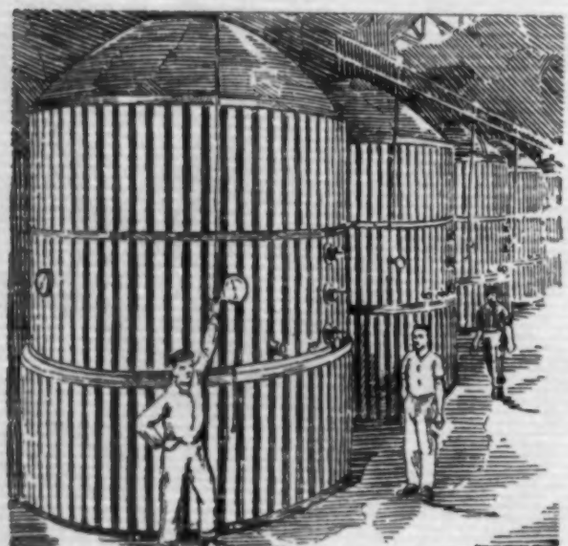


The principle of vapor recompression applied to evaporation: A Swiss installation for concentrating milk

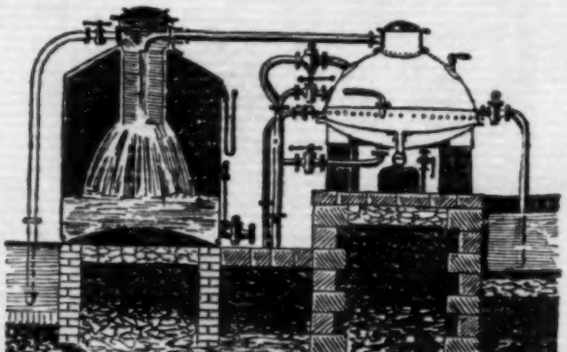
Open-pan evaporation as carried out on many farms even today



Large multiple-effect evaporator of the basket type and having removable steam tubes



A quintuple-effect evaporator for cane juice. This installation is in Cuba



One of the first successful attempts at vacuum evaporation: The Roth evaporator

Tenth Exposition of Chemical Industries

The Program for the Chemical Show and Related Activities Promises to Make the Week of September 28- October 3 a Notable One in American Chemical Industry

WHEN the Tenth Exposition of Chemical Industries opens in Grand Central Palace, New York, on Sept. 28, two years will have elapsed since the last big chemical show in New York. In the interval American chemical industry has made such progress, developing new equipment, processes and products, that a vast amount of new material will be exhibited. As in previous years exhibits will occupy three floors in Grand Central Palace, and will include features of special interest to technical men and the general public.

Two changes in exposition policy are of special interest to technical men. In the first place the management has announced that future expositions will be held biennially, so that two years will elapse before there will be another opportunity to visit the New York show. Second, separate tickets will be issued this year for technical men and the general public, the latter being admitted only in the evenings. From noon to 6 p.m. each day admission will be restricted to manufacturers, engineers, plant superintendents, and other representatives of the chemical industry who will thus be able to inspect exhibits and consult with manufacturers' representatives under the most favorable conditions.

A detailed directory of exhibits and exhibitors, classified by industries and products, will be available for visitors at the information desk.

Court of Chemical Achievement

The principal feature of the exposition will be found in the Court of Chemical Achievement where the outstanding developments of recent years will be brought together in one great group. For some months past a special committee of the American Chemical Society has passed in review dozens of applications to show new processes, products and equipment, and has finally selected 22 exhibitors for the Court. Since no foreign products will be admitted, the display will be an epitome of the recent progress of American chemistry, giving the public in general a clear idea of what constitutes the most important and meritorious advancements in this line. The list of exhibitors and their products is as follows:

American Protein Corporation — Fibrin; Hæmoglobin; Serum Albumin.

Anaconda Copper Mining Co.—Electrolytic White Lead; Electrolytic zinc.

Bakelite Corporation—Bakelite.

Bausch & Lomb Optical Co.—Optical Glass.

Bell Telephone Laboratories, Inc.—Permalloy.

Chemical Treatment Co., Inc.—Crodon, plating alloy.

Chemical Warfare Service—Devices for producing screening smoke; C. N. chloracetophenone (tear gas) munitions; marine piling protection; chlorine treatment in respiratory diseases; cyanogen chloride and hydrocyanic acid gas fumigation; gas masks and canisters.

Corning Glass Works—Pyrex glassware.

E. I. duPont de Nemours and Co.—Vulcone (rubber accelerator); ditolyl guanidine (rubber accelerator); lightfast alcohol soluble colors; sulphanthrene pink FF; galopont colors; ponsol golden orange G; ponsol golden orange R R T; duco; tontine; superfinish fabricoid for bookcovers; low-freezing nitroglycerine explosives; "duPont Oval" smokeless shotgun powder.

Eastman Kodak Co.—259 chemical products.

Ethyl Gasoline Corporation—Tetraethyl lead.

Fansteel Products Co., Inc.—Commercial manufacture of metallic tungsten.

Fixed Nitrogen Research Laboratory—Ammonia catalyst.

Karolith Co.—Karolith, a hardened casein plastic material.

Arthur D. Little, Inc.—Selenium flame-proofing for insulated electric wire.

The Miner Laboratories—Commercial production of furfural and furfural derivatives.

New Jersey Zinc Co.—Germanium dioxide; extremely high purity cadmium; extremely high purity zinc.

U. S. Bureau of Chemistry—Phthalic anhydride; volatilization process for phosphoric acid; ethylene as a means of coloring citrus fruits; fumigation of grain against weevils; preparation of invertase; by-products from corn cobs; products from plants.

U. S. Rubber Co.—Sprayed rubber.

University of Chicago, Department of Chemistry—Isotopes of chlorine and mercury.

Victor Hybinette—High temperature alloys.

Weiss & Downs—Catalytic oxidation of benzol to maleic acid and the derivatives of maleic.

Technical Society Meetings

During the week the American Chemical Society, Technical Association of the Pulp and Paper Industry, National Association of Finishers of Cotton Fabrics, American Ceramic Society, Society of Chemical Industry, and the Chemical Warfare Association, will hold special meetings.

Eleven Eastern sections of the American Chemical Society will co-operate in meetings to be held at the Chemists Club at 10 a.m. daily from Tuesday to Friday inclusive. The first three days will be devoted to a symposium on Motor Fuel and Oil Conservation under the chairmanship of C. O. Johns, director of research, Standard Oil Co. of New Jersey. On the fourth day Rayon will be the subject of discussion. A smoker will be held Friday evening at the Men's Faculty Club, Columbia University. The program is as follows:

Tuesday: Petroleum Aspect of Oil Conservation, K. G. Mackenzie, consulting chemist, Texas Co.

Wednesday: Fermentation Industries and Motor Fuel, M. C. Whitaker, Pres. U. S. Industrial Chemical Co.

Complete Utilization of Coal and Motor Fuel. A. C. Fieldner, Supt. Pittsburgh Station, U. S. Bureau of Mines.

Thursday: Motor Design and Fuel Conservation, C. F. Kettering, Pres. General Motors Research Corporation.

Friday: Development of the Artificial Silk Industry, M. G. Luft, Technical Director, Industrial Fiber Co.

Friday, 7 p.m.: Informal Supper and Smoker, Men's Faculty Club, Columbia University. Speaker, Dr. Alexander Findlay, University of Aberdeen, Scotland.

For the Paper Industry

The meeting of the Technical Association of the Pulp and Paper Industry will be held at the exposition on Wednesday, Sept. 30, at 2 p.m., with the following program:

The Development of the Save-All. G. W. Repetti, The Dorr Co.

Acid Resisting Alloys Used in the Paper Industry. Victor Hybinette.

Heat Insulation in the Pulp and Paper Industry. E. C. Rack, Johns-Manville, Inc.

An Insulated Paper Mill Roof. C. J. Beckwith, Johns-Manville, Inc.

Evaporating Black Liquor. R. S. MacGregor, Ernest Scott & Co.

The Meaning of Hydrogen Ion Concentration and Its Application to the Paper Industry. W. A. Taylor, LaMotte Chemical Products Co.

New Developments in Recovery and Finishing of Paper Pulp. K. A. Pelikan, National Homogenizer Corporation.

Paper Dyes for Clearback Water. John R. Roberts, duPont Co.

Speed Reducers for Paper Mills. J. R. Sharp, Jr., Foote Bros. Gear and Machine Co.

The National Association of Finishers of Cotton Fabrics will meet Tuesday, Sept. 29, at 1 p.m. in the Hotel Roosevelt, and will be addressed by G. J. Esselen, Jr., of Skinner, Sherman and Esselen, Boston, on cellulose fibers in the manufacture of chemical textiles; and by C. H. Herty on control of dye purchases.

Students' Course in Chemical Engineering

Following the practice at previous expositions, a special lecture course in chemical engineering for students will be given during the week. This year the course will be divided into two sections, with separate lectures and demonstrations. Section 1 will include students who are beginning their study of the subject and Section 2 will be for advanced and graduate students and for men in the industry who desire what might be termed a brief post-graduate course.

The morning sessions will begin at 9 a.m. with one general address to all the students with the following subjects and speakers:

Tuesday—The Application of Research to Industry, by Dr. Arthur D. Little.

Wednesday—Sources of Information for Chemists and Engineers, by H. E. Howe.

Thursday—Buying and Selling the Products of Chemistry, by Williams Haynes.

Friday—The American Chemical Industry of Today, by Dr. Charles H. Herty.

After the general address has been delivered there will be two distinct programs as follows:

Group I

This group will comprise students who have knowledge of elementary chemistry.

Tuesday, Sept. 29, 10 to 12 a.m.

Lecture: Disintegration: Crushing, Grinding and Pulverizing. Arthur S. Taggart, Columbia University.

Wednesday, Sept. 30, 10 to 12 a.m.

Lecture: Mechanical Separation: Separation of Solids from Liquids; Filtration, Grading, Classifying, Settling and Thickening. Arthur Wright, Filtration Engineers, Inc., New York.

Solids from Solids; Solids from Gases; Centrifugal Separation: Dust Collection and Precipitation. Speaker to be announced.

Thursday, Oct. 1, 10 to 12 a.m.

Lecture: Separation with Phase Change: Evaporation, Distillation and Drying: Theory—W. H. McAdams, Massachusetts Institute of Technology; Practice—Discussion of Apparatus, Otto Mantius, New York.

Friday, Oct. 2, 10 to 12 a.m.

Lectures: Handling of Materials: Vertical, Lateral, and Horizontal Transportation. A. E. Marshall, Corning Glass Works, New York.

Materials of Construction: What to Use, When, Where and Why: Ceramic Materials to use in Chemical Plant Construction. Ross C. Purdy, Secy., American Ceramic Society, Columbus, Ohio.

Metals, Alloys, Plastics, Wood, Fibres, and Fabrics as Materials of Construction. W. S. Calcott, E. I. duPont de Nemours & Co., Wilmington, Del.

Saturday, Oct. 3, Examinations.

Group II

This group will comprise advanced students and those having a more extensive knowledge of chemistry and chemical engineering.

Tuesday—Sept. 29, 10 to 12 a.m.

Lectures: Disintegration: Some Commercial Applications of Disintegrating Mills. Pierce M. Travis, National Homogenizer Co., New York.

Emulsions and Emulsification. Pierce M. Travis, National Homogenizer Co., New York.

Grinding with Disc Grinders. H. P. Sharpe, A. W. Straub Co., Philadelphia.

Pulverizing and Grinding. Harlow Hardinge, Hardinge Co., New York.

Wednesday, Sept. 30, 10 to 12 a.m.

Lectures: Mechanical Separation: Separation of solids from solids according to particle size. Albert R. Reed, W. S. Tyler Company, Cleveland, O.

New Developments and Operation in Thickening and Clarification. Noel Cunningham, Hardinge Co., New York.

Liquids and Centrifugal Separation. W. D. Cleary. De Laval Separator Co., New York.

Separation by Sedimentation. H. N. Spicer, The Dorr Co., New York.

Thursday, Oct. 1, 10 to 12 a.m.

Lectures: Separation with Phase Change: Dryers and Drying as Used by the Chemical and Associated Industries. F. E. Finch, Ruggles-Coles Engineering Co., New York.

Distillation as a Chemical Engineering Function. H. Austin, Ernest Scott & Co. Chemicals in Foreign Commerce, John W. Wizeman, Chemical Division, Bureau of Foreign & Domestic Commerce.

Friday, Oct. 2, 10 to 12 a.m.

Lectures: Unusual Materials of Construction: Heat Resisting Alloys. Arlington Bensel, Victor Hybinette, New York.

Pyrex Glass. A. E. Marshall, Corning Glass Works, Corning, N. Y.

Bakelite. T. S. Taylor, Bakelite Corp., New York.

Lacquers as Protective Coatings. Arthur Orr, Commercial Solvents Corp., Terre Haute, Ind.

Handling of Materials: Conveying with Steel Belting. James S. Pasman, Sandvik Steel, Inc., New York.

Chemical Dinner

The social event of Exposition Week will be the grand banquet at the Hotel Roosevelt on the evening of Thursday, Oct. 1. Elaborate plans have been made for this affair, which was initiated by the Chemical Warfare Association and in which 14 other associations are participating. The sponsors expect that the attendance will be about 1,000, making it the largest affair of its kind during the season. Senator James Wadsworth of New York will be the chief speaker.

Pyroxylin Invades the Varnish Plant

New Lacquer Plant of Beckwith-Chandler Company Reflects the Trend of Chemical Engineering Progress in a Long Established Industry

A FEW YEARS AGO varnish making might have been cited as one of the older chemical industries that had settled down to the prosaic rôle of standardized production. Then, almost overnight, there came a development that has literally revolutionized the industry, opening up for it a broad field of opportunity that seems only at its beginning. The introduction of pyroxylin lacquer for the finishing of wood and metal surfaces met with such immediate and enthusiastic success that in less than three years there has grown up an industry of impressive proportions. In the last half of 1924, according to the reports of the federal census, there were 45 plants in operation and their production totaled 2,160,300 pounds. Data for the first half of 1925 are not yet available but an unofficial compilation lists 139 firms as manufacturers or jobbers of pyroxylin lacquers and varnishes.

For the most part, this development has been carried forward by two different branches of industry, viz., first, the chemical manufacturers who were experienced in the production and use of nitrocellulose in its various forms, and second, those varnish manufacturers who early recognized in the new product an industrial advance of broad significance. It is in the latter class we find the Beckwith-Chandler Company of Newark, N. J., for 33 years varnish makers for the carriage, railway and automobile industries. This company, desirous of keeping abreast with technical development, entered into the lacquer business after several years research by experienced nitrocellulose technologists. The first unit of the pyroxylin plant was completed in August, 1924, and since that time the company has been producing a complete line of pyroxylin finishing materials.

These include both pyroxylin base undercoats and the finishing lacquers, known under the trade name of "Beckite," and prepared in practically all colors for spray application on metal or wood surfaces intended for interior use. In addition the company manufactures the oil-base undercoats that have long been used successfully in lacquer finishing. The pyroxylin undercoats consist of primers and surfacers. The primers must be thin enough to level out easily and have good adhesive properties. For this reason the pigment content is reduced to the minimum required as an indicator for covering. The surfacers, however, which serve to fill in scratches and file marks, are highly pigmented, for in addition to helping build up the surface for the finishing coats, they must have sufficient filling properties to hide any imperfections in the metal itself. Because of their high pigment content, the surfacers have less anchorage than the primers; therefore they are not applied directly to the bare metal. The finishing lacquers are applied over the undercoats, of either oil or pyroxylin base, in order to give both the desired color and luster.

The site selected for the new plant gives it a particularly favorable location in a growing industrial district of Newark, N. J. The company purchased a 5-acre farm in a tract between the New Jersey Central and Lehigh Valley Railroads, and in the vicinity of the new highway proposed to connect Newark with the vehicular tunnels under the Hudson River. From an engineering standpoint the plant is characterized principally by its compactness, convenient layout and by the use of the most modern equipment that has been developed for lacquer production. The plant is laid out in the form of a single unit and when business justifies it is the intention of the owners to duplicate this unit rather than to expand the existing facilities. Although the manufacturing processes are not essentially different from those described in a previous article (see "The New Pyroxylin Automobile Finish," by S. D. Kirkpatrick, *Chem. & Met.*, August 4, 1924), there are a number of features of possible interest that can perhaps be best discussed by briefly following the course of the raw materials through the different plant operations.

Raw Materials for Lacquer

The chief raw materials for lacquers are nitrocellulose, dry colors or pigments, gums and resins, plasticizers and softeners, and the solvents, latent solvents and diluents. At this plant the so-called R.S.

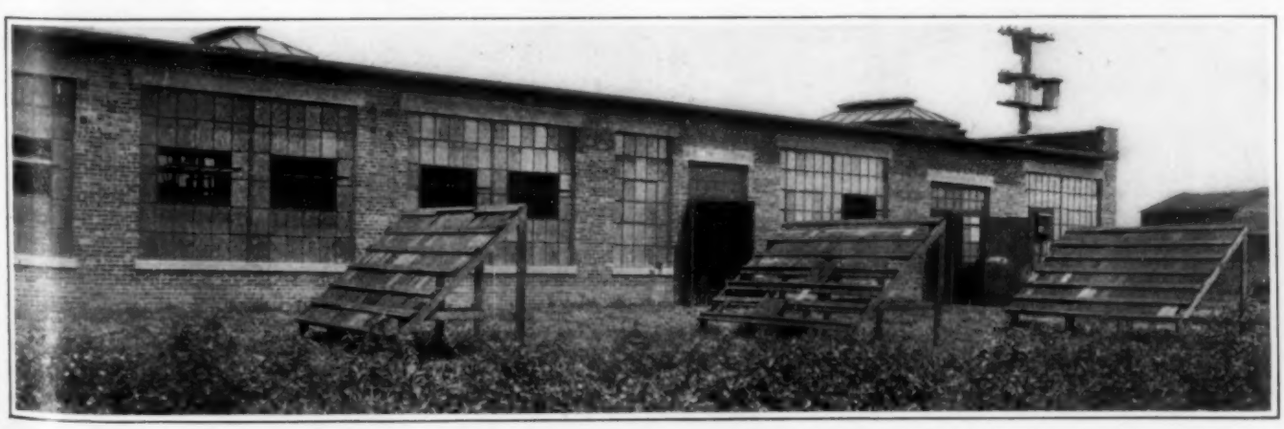


Fig. 1—A Portion of the New Lacquer Plant of the Beckwith-Chandler Co.
Single story, fireproof construction has been used throughout the plant. The three surveillance boards in the foreground are used for exposure tests to determine durability and fastness of color.

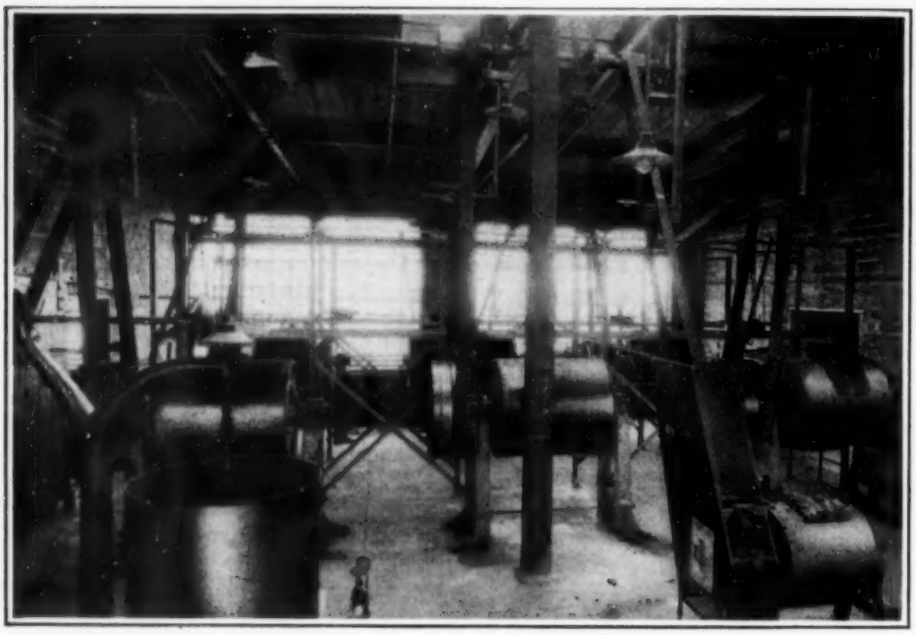


Fig. 2—Pebble Mills in Which the Pigments Are Ground

These Abbé mills, which are charged from the overhead steel platforms shown in the background, serve the dual purpose of grinding and mixing. To be sure, the latter operation is not completed until the solvents and resins have been added and the mixture thoroughly incorporated by means of the mixing equipment shown in Figs. 4 and 5. It has been truthfully said of lacquer manufacture that once having selected the proper ingredients for the product the secret of success lies in the grinding and mixing operations.

(regular soluble) grade of nitrocellulose is purchased on specification. The essential characteristic is low viscosity, in this case one-half second as determined by the standard steel ball method. In addition, the product must be completely nitrated and properly purified for lacquer use. The nitrocellulose, wet down with 30 per cent of ethyl alcohol, is shipped to the plant in steel barrels holding approximately 200 lb. of product.

Since the finished lacquers are made in many colors a wide variety of pigments are needed. The principal requirements of the pigments are fastness, high stability, chemical inertness and an extremely fine state of division.

Plasticizers, represented by the use of camphor in pyroxylin plastics such as celluloid, and castor oil in artificial leather, are characteristic materials of the nitrocellulose industry. The recent commercial development of lacquers, however, has been accompanied by intensive research and corresponding expansion in this field, and as a result a great many new plasticizers have been proposed and a large number actually developed. Those most used include tricresyl phosphate and such higher boiling esters as diethyl, dibutyl and diamyl phthalates. As the name implies, the function of the plasticizers is to give plasticity to the lacquer film, however, without materially lessening the polishing characteristic of the finished surface. In addition the plasticizers must be completely miscible with the solvents, inert chemically, and of low volatility.

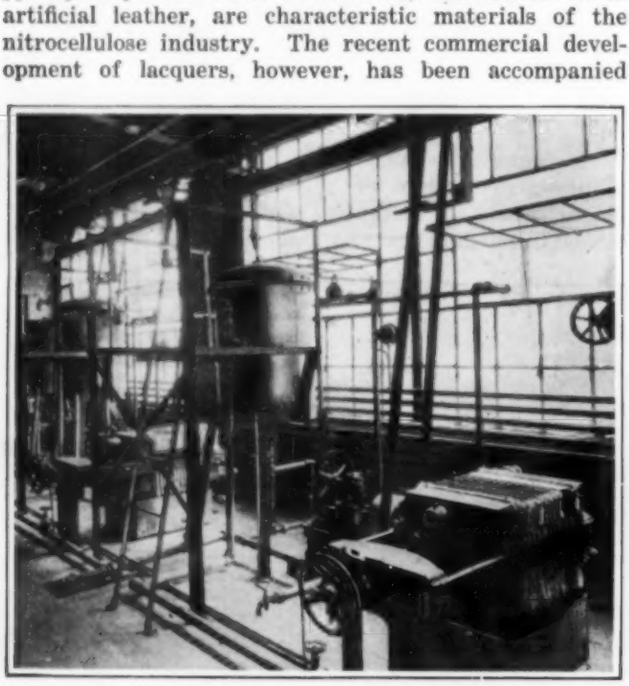


Fig. 3—Presses Used for Filtering Colored Lacquer

This unit of three Shriver presses, each with its own supply tank and pump, has a capacity of approximately 2,000 gal. per 8-hr. day.

The solvents used in the lacquer industry embrace a science of their own making, although, as in the case of the plasticizers, there is a tendency toward a limited number of standardized mixtures. These must be varied to meet different requirements of the finished lacquer, yet as the function of each class of compounds is better understood the choice of a satisfactory solvent mixture becomes less difficult. Of the true solvents for nitrocellulose, acetone and the esters, ethyl acetate, butyl acetate, and amyl acetate, are most used. Anhydrous ethyl alcohol, butanol, and amyl alcohol are latent solvents that serve to blend certain of the resins with the nitrocellulose solution. Benzol, toluol and xylol are classed as diluents, although they are in reality solvents for the resins and act as blending agents for the other materials. Due to their low miscibility with water they are especially desirable for this purpose.

A wide variety of varnish resins is available to the lacquer manufacturer, and the choice depends on the characteristics of the film desired, the solubility of the resin and its cost. As a rule the copals are most used.

Actual manufacturing operations at the Beckwith-Chandler plant may be said to start in the mill room shown in Fig. 2. Here the pigments are ground in six pebble mills made by the Abbé Engineering Company. These mills have cylinders 3 ft. in diameter, and 3½ ft. in length, which give each a total capacity of 110 gal. or a working capacity (when half full of pebbles) of 75 gal. The mills are connected by belts to the overhead shafts, driven by a 25-hp. electric motor, which is located in an adjoining storage room, and separated from the mill room by a fireproof wall.

It is common practice to grind the pigments in the pebble mill with the plasticizers and a portion of the solvents. The proportion by weight of pigment and plasticizer depends upon the specific gravity of the pigment. In general, the pigment makes perhaps a third by weight of the total solids.

The secret of good lacquer making, once the proper materials are selected, lies in the grinding operation, and especial care is taken to make sure that the required fineness is obtained, and that the different materials are thoroughly incorporated into the finished lacquer. The time of grinding, which differs with each pigment, is not a sufficient index of the operation, however, and it is customary to withdraw samples of paste from time to time which are tested for their smoothness.

Mixing and Filtering

The mixing equipment of the present unit of the plant consists of 2 Ross mixers, having capacity of 200 gal. each, 6 closed-type Day color-blending mixers each of 200 gal. capacity and 2 Pfaudler glass-lined mixers each holding 500 gal.

The Ross mixers are used principally for dissolving the nitrocellulose in the solvents, and for the preparation of clear lacquers. Mixing is accomplished by revolving paddles that move between stationary baffles, thus giving the effect of double-motion mixing. The Pfaudler equipment which has enameled steel agitators of the propeller type is preferred for mixing the pigmented lacquers, principally because there is less tendency for the product to stick to the sidewalls, and as a result the glass-lined mixer is more easily cleaned. These mixers also have conical bottoms leading directly to the pumps which make it possible to recycle any of the material that may have settled and thus insure uniformity of shade in the entire contents of the equipment.

The ground pigments and dissolved resins are added to the nitrocellulose solutions and thoroughly incorporated in the mixers. In the case of the clear lacquer, the product is filtered through a filter directly attached to the discharging valve of the mixer. The pigmented lacquers, however, are pumped to intermediate storage tanks from which they are filtered under pressure in Shriver plate-and-frame presses. The supply tank, pump and filter for the three units are shown in Fig. 3.

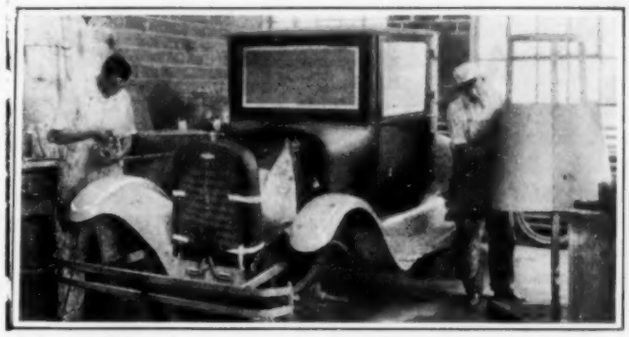
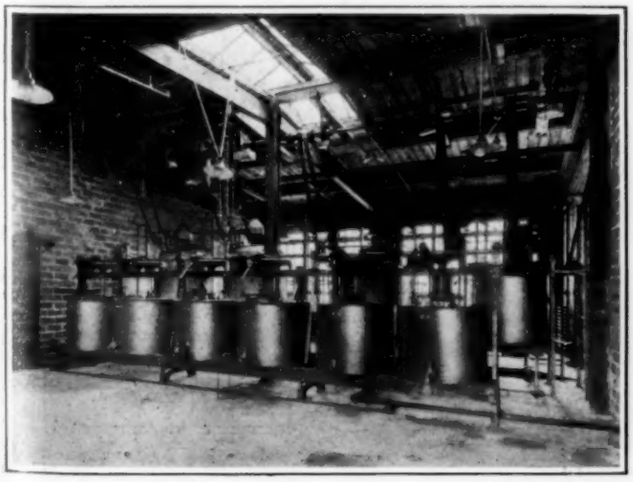


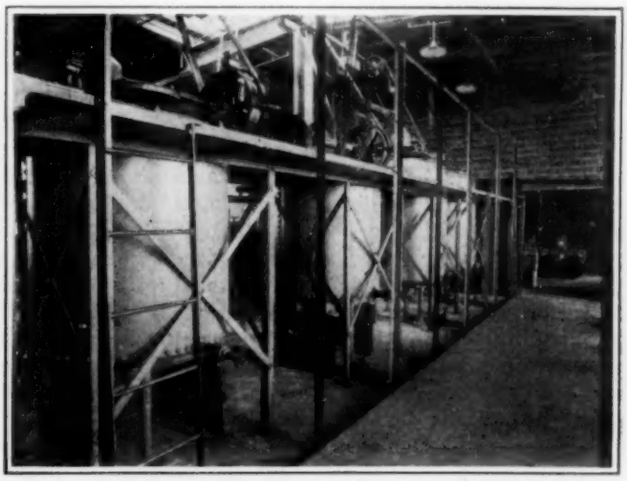
Fig. 6—Refinishing an Automobile with Pyroxylin Lacquer Showing the Manner in Which This Modern Finish Is Applied

The pump, a two-cylinder Worthington, delivers the lacquer to the press at a maximum pressure of 150 lb. per sq.in., but the average working pressure is about 50 lb., depending upon the fineness of pigment and the filtering medium used. The filter presses are of small size, using only 18-in. plates, yet their daily capacity of 2,000 gal. for the unit is ample to handle the output of the mixing equipment for colored lacquers.

A feature of the plant is the provision of apparatus for thorough testing of materials and finished products, as well as experimental equipment for developing special finishes and testing out new formulas. In addition to the laboratory there is a completely equipped finishing room (see Fig. 6) where commercial finishes may be sprayed on to automobile bodies, furniture, and other surfaces to be tested. The laboratory apparatus includes a Cooper-Hewitt X-ray testing machine of the type that has been developed in the laboratories of the General Motors Research Corporation, at Dayton, Ohio. The data of accelerated testing thus obtained are confirmed by actual exposure tests on the surveillance boards shown in Fig. 1. It will be observed that, in keeping with standard practice, these boards are inclined at an angle of 45 deg. with southern exposure.

These outdoor tests, with their comparison of all types of both lacquer and oil varnishes, have revealed some interesting data on the endurance of these finishes. They serve to support the view that the application of the pyroxylin product is only at its beginning. The next few years will doubtless see a tremendous expansion of the useful applications of this remarkable material.





Figs. 4 and 5—Views of the Mixing Room Showing Different Types of Equipment Used for Mixing Pyroxylin Lacquers
In the foreground at the left is the battery of six Day color-blending mixers. The view at the right shows the Ross and Pfaudler mixing equipment provided with convenient charging platforms.

An Improved Thickener-Filter for Chemical Operations

A Development, that Consolidates, in One Machine, a Thickener of Increased Capacity and a Filter to Remove the Liquid from the Free Settled Sludge

By Noel Cunningham,
Hydrometallurgical Engineer, Hardinge Co., Inc., York, Pa.

THE new thickener-filter, invented by H. S. Coe and developed by A. L. Blomfield and the operating staff of the Golden Cycle Mining & Reduction Co. at Colorado Springs, Colorado, consists essentially of a cylindrical walled tank having a permanent, porous, false bottom upon which is supported a destructible filter bottom of several feet thickness composed of fine granular particles. Solids in any state of greater or less dilute suspension enter the tank preferably at one side, the flow being across the tank toward an overflow extending around 90 deg. of the periphery. The tank provides sufficient surface area to allow the solids to drop out of suspension, the action of the filter bottom accelerating the settlement of the solids by lowering the density of the column of solids existing in a state of partial suspension. The action of the filter bottom is as if magnetic particles were passed over a charged magnetic plate, whereas, if the same particles were passed over the same plate unmagnetized, we would have the comparative action of an ordinary thickener or settling tank. A slowly revolving single spiral sweep draws the settled solids across the filter bottom from the periphery toward the center of the tank, the continued filter action being sufficient to dewater the settled solids from an emulsion to the consistency of thick, tacky mud, approximating vacuum filter cake. The spiral sweep is lowered an infinitesimal distance at each revolution so that not only the settled compacted solids are removed but also a minute portion of the filter surface which is thus kept clean and uniformly active.

Its Field of Application

The application of the new equipment, which has been given the name "superthickener," varies according to the solid content of the feed which it is required to handle; as this increases from extremely minute to maximums approaching solid-saturated emulsion it functions progressively as a clarifier, a thickener-filter and a filter. The range from clarification through thickener-filtering has been so thoroughly studied under all conditions which can be anticipated in practice that presupposing any given condition, the probable performance can be stated. Within the limits of actual filtration we are not prepared to state as yet what all the possibilities of the new thickener are, although an experimental run on a prethickened feed has given some significant results which will be discussed in a later part of this paper.

Where colloidal content of feed is under 2 per cent or liquid element over 98 per cent the removal of liquid may be entirely through the filter bottom. Flows requiring clarifying vary. Typical instances are: removal of discolorations, as, for instance, vegetable stains from water; elimination of occasional specks of foreign matter from water to be used in the manufacture of high-grade paper. With increasing solid content, we encounter undesirable cloudiness due to suspended impurities in liquids for evaporation; cloudiness passes into turbidity of all degrees, the suspended solids often being of such character that settlement and removal by decantation is impossible. As turbidity increases beyond the limit where all liquid may be drawn through the filter bottom, resort must be had to preliminary thickening and removal of the solids, as discussed later, and clarification of turbid or cloudy overflow.

Using the thickener as a clarifier the spiral sweep is rotated only as required to maintain a predetermined delivery of filtrate. With very small solid content filtration through the granular filter bottom may be actuated simply by gravity but generally a positive pump suction is required. A vacuum pump may serve but ordinarily sufficient suction is obtained by the use of a force pump adequate for delivering the flow. The caked solids removed by the occasional rotation of the sweep will, of course, be contaminated by the granular element constituting the filter bottom and where this is undesirable or where the advantage of the machine will not more than counter-balance this disadvantage the "super thickener" does not apply.

The cycle starts with a five-foot-deep granular filter bottom and this is gradually cut away at a rate depending upon the frequency of cut required to maintain flow. With very turbid liquids a cut might be required as often as twice during 24 hours' operation, while in many cases a cut might not be required once a month. The amount cut away each revolution of the spiral is controllable but experience has shown 0.01 of an inch adequate; ordinarily the spiral sweep is rotated twice in making a cut so that 50 cuts can be

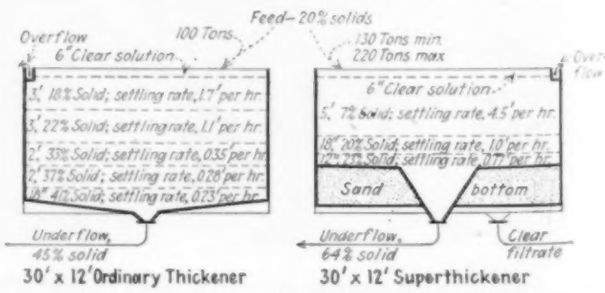

Feed—20% solids
Overflow
6" Clear solution
100 Tons
3', 18% Solid; settling rate, 1.7' per hr.
3', 22% Solid; settling rate, 1.1' per hr.
2', 33% Solid; settling rate, 0.35' per hr.
2', 37% Solid; settling rate, 0.28' per hr.
Underflow, 45% solid
30' x 12' Ordinary Thickener
130 Tons min.
220 Tons max
Overflow
6" Clear solution
5', 7% Solid; settling rate, 4.5' per hr.
18", 20% Solid; settling rate, 1.0' per hr.
12", 25% Solid; settling rate, 0.77' per hr.
Sand
bottom
Underflow, 64% solid
Clear filtrate
30' x 12' Superthickener

Fig. 1. Illustrating the effect claimed for thickening with the new "super thickener"

Adapted from a paper on "Improvement in Thickening and Water Clarification," presented before the American Institute of Chemical Engineers, Providence, R. I., June 23, 1925.

made for each inch of bottom or 3,000 cuts before the bottom must be renewed.

Any granular material is suitable for filter bottom provided it is practically free from colloid. In general the finer the material the better, but where a coarse complex is used it must contain sufficient very fine grains to close voids. Penetration of the filter bottom by the finest colloid occurs only to a depth equal to the diameter of the average particle composing the filter

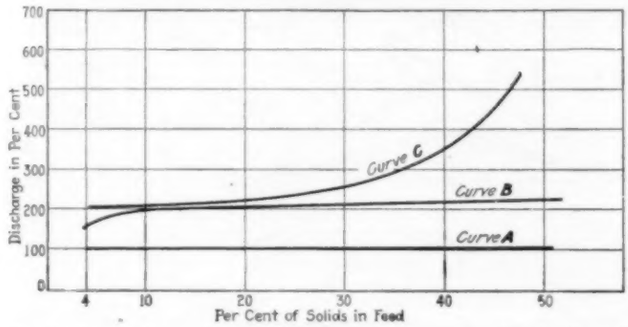


Fig. 2. Comparing ordinary thickener performance with depth and top feeds for "super-thickener"

Curve A, ordinary thickener; Curve B, "super-thickener" with feed at surface; Curve C, with feed on surface of sand filter

bottom. Theoretically the greater or less coarseness of filter bottom should control the depth of cut in renewing the surface, but bottoms varying from quite coarse to very fine have been tried and no difference occurs in results obtained.

As the colloid content of the feed increases above 2 per cent the flow of filtrate falls off sharply and the overflow begins to function rapidly, becoming the chief factor in elimination of excess liquid. With a 3 per cent colloid in feed, the filtrate will approximate normally 1½ tons per ton of dry solid in underflow and as the proportion of solid in feed still further increases with consequent increase of thickness of cake on the filter bottom, the filtrate falls off until on a normal, practically non-permeable ore slime, the filtrate in proportion to dry solid becomes constant at a point slightly in excess of the moisture reduction involved in compacting a free settled slime emulsion to the approximate consistency of vacuum filter cake.

The action of the "super thickener" thus passes out of the field of clarification into that of thickener-filtration, the rotation of the spiral sweep is continuous and the products become (1) a comparatively large unclarified overflow, (2) a comparatively small crystal clear filtrate, and (3) a thick underflow approximating filter cake intermixed with a small percentage of granular material composing the filter bottom.

Use As a Filter

As the proportion of solids in the feed still further increases with proportionate decrease in liquid to be eliminated, the quantity of filtrate, though still maintaining its constant relation to the solid element, begins again to become a considerable element of total liquid product. As slime feed more nearly approaches the consistency of maximum free settled emulsion, overflow practically ceases and the action of the thickener leaves the field of thickener-filtration entering that of straight filtration. Results obtained from tests at the Golden Cycle mill are significant in this connection. The "super thickener" was used on a pre-thickened feed (about 45 per cent solids) and delivered a 65 per cent solid underflow. This would correspond to using the machine as a filter for the Butters filters at Golden Cycle deliver a cake containing 67 to 68 per cent of solids.

In Fig. 2 Curve A shows the tonnage handled by a 30-ft. by 10-ft. thickener of the ordinary type; Curve B shows the capacity of a 30-ft. by 10-ft. "super thickener" with the usual top feed; and Curve C shows the results obtained from different percentages of solid in the feed when the new machine is used as a filter (with depth feed). It will be noted that whereas the "super thickener" with the feed delivered at the surface has from 1.5 to 2 times the capacity of the ordinary thickener, depending upon the thickness of the feed, when the percentage of solids in the feed increases above 30 per cent and is delivered to the sand filter surface, the capacity is tremendously increased, becoming at 48 per cent solids, 5 times that of the ordinary thickener and 2.5 times that of the "super thickener" when fed in the ordinary way.

The actual cost of renewal of granular filter bottom is so dependent upon local considerations that no general statement on this point is possible. As a basis for comparison elsewhere the following data from the Golden Cycle practice will be of interest:

Thickening-Filtration

Size of tank, 30 ft. diameter by 10 ft. deep.
Depth of destructible filter bottom, 5 ft.
Tons of destructible filter bottom, 175.
Cost of labor and power renewing filter bottom, $4.00.
Power and labor cost installing each ton of filter bottom, 2¼ cts.
Tons of dry slime super-thickened per 24 hours, 200.
Filter bottom cut away per 24 hours' operation, ⅛ in.
Corresponding weight of bottom cut, 4,640 lbs.
Power and labor cost of bottom cut per 24 hours, 5¼ cts.
Power and labor cost of bottom per ton of slime super-thickened, 0.026 ct.

Clarification

Filter bottom cut per 10,000 tons solution clarified, 0.5 in.
Filter bottom cut per million gallons solution clarified, 0.2 in.
Filter bottom cut per 10,000 tons solution clarified, 2,900 lbs.
Filter bottom cut per million gallons solution clarified, 1,160 lbs.
Power and labor cost per 10,000 tons solution clarified 3.26 cts.
Power and labor cost per million gallons solution clarified, 1.3 cts.

Fig. 1 shows graphically the comparative effects of ordinary thickening and thickening with the new device. This is taken from actual records of sampling an ordinary thickener and a "super thickener" of the same size at various depths and shows why the latter can handle

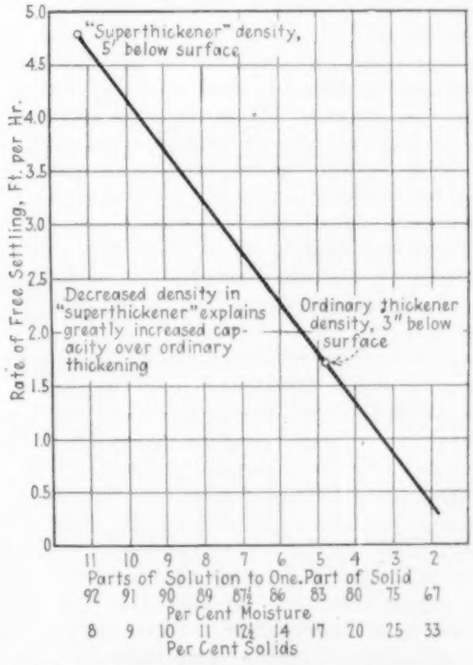

Rate of Free Settling, Ft. per Hr.
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0
"Superthickener" density, 5' below surface
Decreased density in "superthickener" explains greatly increased capacity over ordinary thickening
Ordinary thickener density, 3" below surface
11 10 9 8 7 6 5 4 3 2
Parts of Solution to One Part of Solid
92 91 90 89 87½ 86 83 80 75 67
Per Cent Moisture
8 9 10 11 12½ 14 17 20 25 33
Per Cent Solids

Fig. 3. Rates of settling at various dilutions. Operations at Golden Cycle Mining and Reduction Co.

a greater tonnage than the ordinary thickener and at the same time deliver an underflow equivalent to air-dried vacuum filter cake. Fig. 3 shows the effect of decreased density column on settling rate. Settling rate 5 ft. below the surface in the "super thickener" was 4½ ft. per hour, as compared with a settling rate of 1½ ft. per hour 6 in. below surface in an ordinary thickener.

Fig. 4 shows general arrangement of the "super thickener" which is in operation at the Golden Cycle plant at Colorado Springs, Colorado.

Sand cuts varying from ¼ in. to 8 in. per twenty-four-hour day have been tried, and Table I gives percentage effectiveness of the "super thickener" on a tonnage fed basis at various cuts operating on Golden Cycle slime, the capacity of an ordinary thickener of same size running in parallel on identical feed being taken for comparison at 100 per cent. The test on each cut lasted for a period of from eight to ten days.

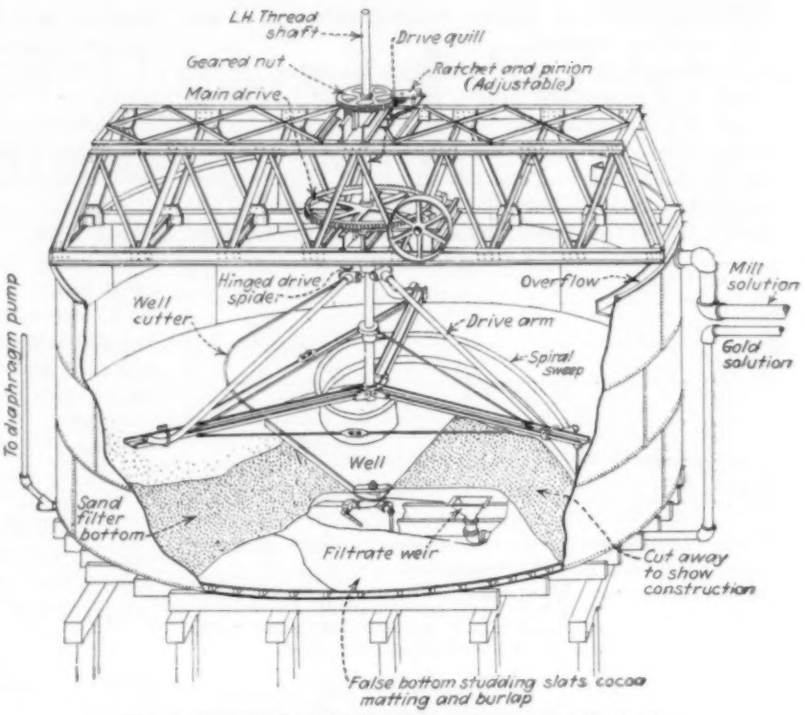


Fig. 4. Construction details of new thickener and clarifier.

TABLE I—COMPARATIVE EFFECTIVENESS AT VARIOUS CUTS

Tonnage handled by ordinary thickener, 100 per cent. Solid content of underflow 45 per cent. Solid content of underflow, 64 per cent.

	Superthickener
Depth of Sand Cut per Twenty-four Hours, In.	Tonnage Handled, That of Ordinary Thickener in Parallel Equaling 100 Per Cent, Per Cent
¼	130
½	150
¾	195
1	218
2	225

At Golden Cycle all conditions for filter bottom renewal are ideal. Sand going to leaching plant is classified on the floor above the thickener and can be by-passed to flow by gravity into the tank.

The actual placing of the new filter bottom requires about 3 hours and the attention of one man; the sweep is rotated during filling to level the sand coming to the tank and this requires about one horsepower. Where it is necessary to deliver granular material from a remote point in the operation a sand pump will be required. If it becomes necessary to classify a granular element from a plant product carrying a certain proportion of suitable element it involves the use of some simple form of classifier as well as a pump, and it might be necessary to store bottom material to assure quick renewal.

In many cases where it is necessary to intermix two elements, as where kieselguhr must be mixed with a gummy colloid to effect filtration, a very exact and intimate mixture is made possible by making the filter bottom one of the elements. This perfect mixing emphasizes an attractive feature of the "super thickener"; any operator experienced in thickening and filtration knows the trouble and expense involved where elements of varying settling characteristics must be handled simultaneously. In this case the result has invariably been segregation. This applies not only where two elements in the same bath vary in specific gravity, but also where materials of the same chemical composition vary in fineness—the quick settling particles will segregate from those of slower settling rate, a condition which leads to poor washing, loss in filtration, excess liquor for evaporation and non-uniformity of product. The action in the "super thickener" is to eliminate segregation during treatment and the underflow is too thick to allow segregation in transfer, storage or further treatment.

Did 1923 See the Peak for Petroleum Production?

A COMMITTEE of the Mining and Metallurgical Society of America has lately issued a report on supply, consumption and stocks of petroleum in the United States, that contains some significant conclusions as to the present and future status of this industry. It clearly indicates, although it is still too early for definite confirmation, that 1923 saw the peak of our domestic oil production. In that year the overlapping of flush productions in a number of large pools brought the total supply (production plus imports) up to 832 million barrels, representing over 80 per cent of the world's supply for that year. The amazing rapidity with which the industry is growing is evidenced by the fact that the 1923 total more than doubled the 1918 supply of 395 million barrels, the peak of war-time effort.

The supply curve, which each year since 1910 had shown a marked rise, turned abruptly downward in 1924. This reversal, in the opinion of the committee expressed in its report to R. M. Catlin, president of the Society, is the most significant indication that has yet developed. "Not all the large pools in the United States (including deeper sands in old pools) have been discovered" says the report "but the probability is that the 1923 figure will not be exceeded unless several large undiscovered pools or new large-producing sands in old districts are brought to peak production within a single year."

Chemical Industries of Pacific Coast Receive Attention of A. C. S.

Technical Sessions at Los Angeles on Industrial Chemistry, Petroleum Products and Wood-Waste Utilization Prove Especially Informative

Editorial Staff Report

ENGINEERING and industrial subjects took prominent place at the opening technical sessions of the 70th meeting of the American Chemical Society at Los Angeles, August 3 to 8. In introducing the discussion before the industrial division, the chairman, C. A. Newhall of Seattle outlined the early growth of the chemical industries of the Pacific Coast region. These were established primarily for the protection and maintenance of the more basic industries—agriculture, mining and hunting—and for the utilization of local raw products. In the former class he mentioned sulphuric acid, carbon bisulphide and the refining of sulphur; in the latter class, borax, potash, citric acid and cream of tartar, to mention but a few.

The manufacture of benzol from oil gas at Portland is a comparatively recent development, and a paper on the subject, by E. L. Hall, general superintendent of the Portland Gas & Coke Co., was read by W. M. Berry. The author described the pioneer work at the Portland plant in the removal of objectionable sulphur compounds and naphthalene, and the manufacture of c.p. and other commercial grades of benzol. The growing importance of the benzol industry in the United States is evident from the fact that about 90 million gallons was used in 1924, 80 per cent of which was consumed as motor fuel. In time, the author declared, all coal will be coked, and an average recovery made of about 2½ gal. of light oils per ton.

The Portland plant, which cost $450,000, is capable of treating about 900,000 cu.ft. of crude oil gas per hour. The process involves the use of wash oil, with an efficiency of extraction of the benzol averaging about 96 per cent provided the benzol content is not allowed to rise above 0.5 per cent; but an average saturation up to 3½ or 4 per cent is more economical in practice. The process of extraction is continuous, but recovery of the benzol is effected by batch operations.

Nitrogen Fixation to the Fore

Comprehensive schemes for the development of water power in the Northwest, in operation and in prospect, are of sufficient magnitude to suggest a reconsideration of the question of the economic practicability of the introduction of the arc process of nitrogen fixation in the United States, according to Professor H. K. Benson of the University of Washington, who discussed a subject introduced by himself and his associate, W. L. Beuschlein. The successful solution of the problem is contingent on an ample supply of cheap power. The municipal plants of the Northwest are leading the way, and the City of Tacoma has demonstrated that it is profitable to sell what is known as waste current for as low as $10 per kw.-yr., whereas the charge for continuous current is about $30 per kw.-yr. The Northwest has a potential hydro-electric power supply of considerable magnitude, and active steps are being taken to utilize this. One series of units, to produce 600,000 hp., is now being planned.

Details were given of the synthetic ammonia plant, producing three tons per day, operated by the Pacific Nitrogen Corp. at Seattle, Wash., and utilizing the American process, as described in *Chem. & Met.* of June 16, 1924. An arc process plant for the production of sodium nitrite has been in operation by the American Nitrogen Products Co., at La Grand, Wash., almost continuously since 1916, and recent enlargements draw attention to the future possibilities of the industry. The Wielgolaski furnace is used, and an output of 60-gram nitric acid per kw.-hr. is secured.

The correct height of coke in the reaction tower and correct flow of gases proved to be important factors in the development of a successful commercial process for the manufacture of hydrochloric acid from chlorine, steam and coke, by a reversal of the Deacon process, at the plant of the Great Western Electrochemical Co. at Pittsburg, California, according to W. Hirschkind, who presented a paper on the subject. Various gas outlets at different levels are arranged in the apparatus used. The coke is first heated to redness by a hot-air blast. Chlorine and steam are then introduced at the bottom of the tower, after which the reaction may continue for months without further attention. Temperature is maintained at 900 deg. C., and any type of oil or gas coke, free from organic or volatile constituent, is suitable.

Developments in Petroleum Technology

The simplification and standardization of methods of petroleum treatment deserve consideration, and a paper by W. S. Baylis described some recent applications of Filtrol in the industry. Attention was drawn to the opportunity for more economical operation by the use of a highly active and standardized product in the so-called contact method of filtration; and to the possibility of discarding neutralization with caustic after acid treatment, or of adopting a direct treatment of the oil without even the customary preliminary acid treatment.

The filtration of light distillates by what is known as the continuous instantaneous method was described, the essential equipment consisting of no more than an agitator vat, pump system and filter press. The attractive feature about the process is the double contact with Filtrol that results—in the treating tank and again in the filter press. Lubricating oils that have been acid treated may be contacted with partly spent Filtrol at a desirable temperature, then filtered and contacted with fresh Filtrol. The first step removes the

products of acid refining at low temperatures. It is performed at atmospheric pressure, the second filtration being done in vacuo. To avoid acid treatment altogether, the oil is subjected to two separate contacts and filtrations, the second under vacuum. Stabilization of color is insured by the addition of a small amount of acid in the first operation, after which the mixture is agitated, then a small amount of silicate of soda is added, then the partly spent Filtrol. Contact and filtration with fresh material follow.

In concluding, the author discussed the reclamation of used lubricating oils and the reactivation of the adsorbent. Research is under way that points to the practicability of reactivating Filtrol in the filter press, with superheated steam.

Evaporation losses from stored gasoline have been reduced to a minimum in consequence of the development of counterbalanced breather bags, connected to the vapor space, according to a paper presented by R. E. Wilson and associates in the Standard Oil Co. of Indiana. The material used is a special gasoline-proof fabric, and the results of operation have demonstrated the practicability and efficiency of the new method. A 3- or 4-oz. fabric is used, which in process of treatment is run through a hot bath of glue, glycerine and preservative, the rate of movement being controlled to insure an even disposition of dope of the correct thickness. The bags are cylindrical, with spherical ends. Comparative figures show that the loss without the breather bags may be 0.34 per cent per month, as compared with 0.03 per cent with them, which is due to seam leakage. Without the new device the loss is variable, being less in winter than in summer.

New Use for Sulphite Liquor

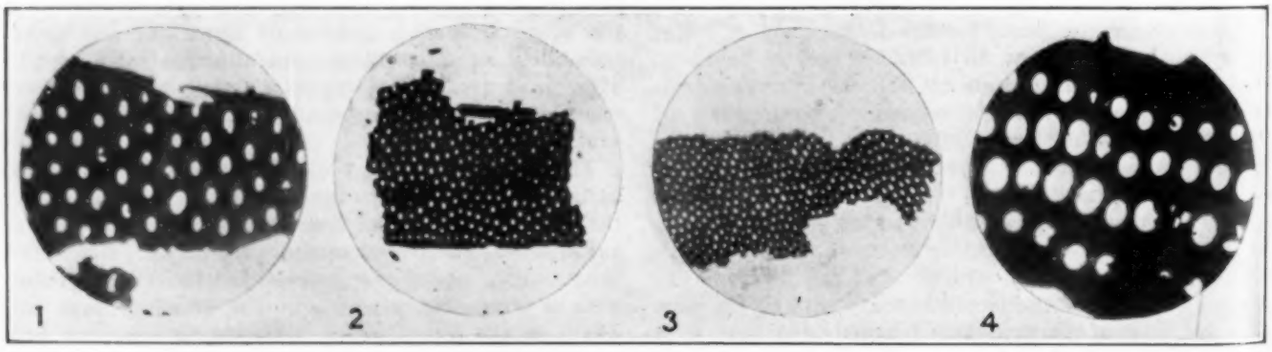
A research of interest to many technical industries and of probable benefit to the paper-pulp industry was outlined in a paper by E. C. Bingham, G. F. Rolland and G. E. Hilbert, introduced by Professor Bingham and entitled "Sulphite Liquor as a Protective Colloid." This product of the sulphite process is being run to waste in enormous quantities. According to results obtained by the investigators, the purified liquor has many remarkable qualities that suggest several useful applications. As a protective colloid it may be used to stabilize suspensions, emulsions and foams. It has the power to facilitate the wetting of many finely divided substances that under normal conditions resist contact with a liquid. It was mentioned that the liquor might be used as a constituent of the clay body used in ceramic work, whereby less water is necessary to insure plasticity and greater ultimate strength is secured. The highly adhesive characteristics of sulphite liquor are responsible for its lubricative properties.

Reveals Identity of Decolorizing Carbon

The first highly active adsorbent of the charcoal class was a Dutch product known as Norit, introduced about 1911 and since used extensively here and abroad. Its superior qualities have only been rivaled in recent years. Its composition remained a secret until definite identification was made recently by H. G. Tanner, of the University of Oregon, who presented a paper on the subject. Details of the investigation are as follows:

A fairly large sample of the material, which has the appearance of ground charcoal, was examined, and a piece about ¼ in. cube was discovered that had apparently escaped whatever screening was being practiced. The presence of rings confirmed the preliminary assumption that the substance was charcoal. Microscopic slides (see Figs. 1–4) were made of particles of Norit and compared with those of over 300 different species of charred woods. Various methods of charring were adopted, but it was found that, whatever the method used, the structure resulting was peculiar to the species. A sample of charred birch under the microscope proved identical to the sample of Norit. Further tests were made and a method of extended charring was ultimately adopted whereby the adsorptive effect of the prepared birch charcoal was the same as that of commercial Norit. When carbonization was extended so that the weight of the charcoal was 7 per cent of the weight of the original dry wood, the product resembled Norit in behavior and appearance.

The enormous wastage of wood in the lumber industries of the Northwest prompted interest in two papers, on the utilization of such scrap as hog fuel and in the manufacture of gas, by O. F. Stafford, of the University of Oregon. The wood waste used under Dutch-oven furnace boilers represents an alternative to 2 to 2½ million barrels of fuel oil annually. As a substitute for ordinary commercial gas, wood gas has many possibilities, and prospects for its extended use are bright because coal and oil are not easily available in the lumber districts. At Auburn, Wash., gas is made for commercial and domestic purposes from wood waste, a coal-gas set being used, which has functioned successfully for several years. The product has a heat value of 480 B.t.u. per cubic foot, but contains from 10 to 20 per cent of carbon dioxide, which must be removed before distribution. The cost of the gas compares favorably with other fuels.



1. Willow. 2. Norit. 3. Birch. 4. Poplar.

Figs. 1-4—Photomicrographs of Norit and Various Wood Charcoals—One Phase of an Investigation that Revealed the Identity of the Imported Adsorbent as Made from Birch

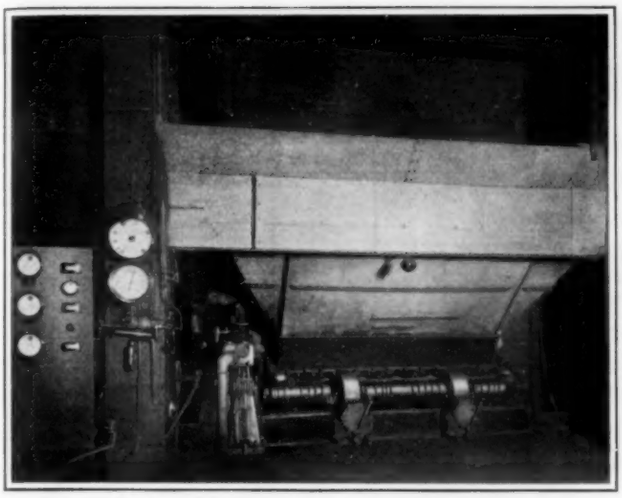


Fig. 1—Indicating Instrument on Front of Boiler
The indicator shows instantaneous ouptut of the boiler, thus forming a reliable guide for firemen. The upper, large dial is that of the steam flow meter

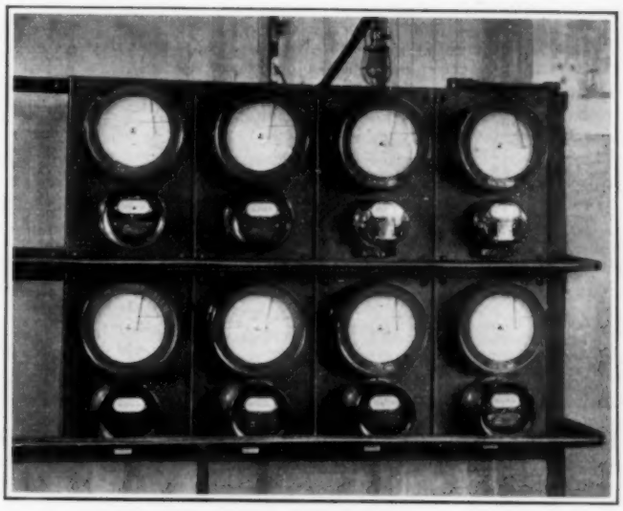


Fig. 2—Recording and Integrating Instruments
An electrical system of recording makes possible remote control of steam generation. The panel shown above is handy to the operating superintendent

Flow Meters in the Accounting of Process Steam

Maximum Operating Economy and Accurate Distribution of Departmental Expense Impossible Without Precise Control Devices

By Chaplin Tyler
Assistant Editor, *Chem. & Met.*

Conservatism in management, sometimes amounting to backwardness, has kept many a plant from showing increased profits through the efficient generation and distribution of steam. The experience of the plant described herewith is typical of the possibilities of a comparatively small capital outlay in control devices. Not only did the steam flow meters point the way to substantial savings in steam costs; for the first time an accurate and timely basis for cost accounting was provided. It is felt that even small plants might well investigate the precise measurement of steam.

MODERNIZING control methods in steam generation and distribution has saved more than $100,000 annually in a large plant the principal products of which are soap, glycerine and refined oils and fats. The installation of 15 flow meters for the measurement of power and process steam used by the many production departments, was the principal factor leading to this substantial reduction in costs. Increased furnace and boiler efficiency, more economical utilization of process steam, detection of leakage losses, and the provision of accurate steam consumption data for the cost department are some of the advantages that were derived immediately from the continuous daily flow meter records.

Prior to the installing of steam flow meters about 3 years ago, the annual consumption of coal was 38,000 tons, burned at a furnace and boiler efficiency of about 60 per cent. More than 40 per cent of the total steam generated was unaccounted for and had to be apportioned to the various departments and prime movers. Although the cost of making steam was apparently 52c. per 1,000 lb., the evaporation, as calculated from venturi-meter readings was only 8.4 lb. per lb. of coal. Reports showed that the cost of steam charged to glycerine distillation far exceeded a reasonable standard, and a heavy loss was being shown in this department. Similar wastage of steam was suspected in the other operating departments, with the result that the installation of adequate metering equipment was decided upon.

The first step in improvement was an attempt to increase the efficiency of steam generation. Investigation showed that the load on the boilers varied widely, and that by operating at a proper per cent of rating, 4 boilers could meet all demands for power and process steam. Furthermore, the discarding of surplus boilers made possible a reduction in direct labor from 38 to 16 men. The installation of steam flow meters, besides reducing fluctuations in operation to a minimum, provided a dependable guide for the firemen who could anticipate any marked increase in load, such as extra steam for soap boiling.

Comparative costs of steam generation during two equivalent 3-month periods 4 years apart, are shown in Table I. Analysis of the expense items in this table brings to light some significant contrasts. The cost of coal (which has been expressed on the basis of $4.65 per ton, the price paid in 1924) was nearly halved, and the next largest item, that of operating labor, was reduced about 65 per cent. On account of the abandonment of much of the boiler plant equipment, interest on the investment was halved, and rent on the space occupied by equipment was lessened somewhat. A greater part of the rent was for coal storage space in the yard. The depreciation charge has been increased to provide an adequate equipment reserve fund. The total reduction in steam generation costs was 42 per cent, which is equivalent to an annual saving of at least $100,000.

Reference to Table II shows how it was possible to decrease the amount of steam generated without impairing factory production. Although the weight of steam generated in the last quarter dropped from 168,000,000 lb. to 99,000,000 lb., it will be noted that the live steam accounted for decreased but 9,371,000 lb., from 99,600,000 lb. to 90,229,000 lb., thus indicating a much greater effectiveness in utilization. It is in lessening unaccounted steam that the flow meters played the greatest part. Leaks and undue heat losses were located, and wasteful practice, such as the use of from 2 to 4 times the required amount of process steam, were stopped entirely. The result was a decrease in un-

Table I—Comparative Costs of Steam Generation Before and After Installation of Steam Meters

	Quarter Ending Jan. 1, 1921; Steam Not Metered	Quarter Ending Jan. 3, 1925; Steam Metered
Coal (Basis of $4.65 per ton)	$42,156.90	$21,692.25
Water	509.24	542.90
Direct labor	16,294.09	5,703.03
Repairs, renewals and supplies	13,222.20	10,164.21
Steam to boiler auxiliaries	2,205.50	610.50
General expense	798.00	250.00
Rent of space and coal storage	4,355.89	3,944.41
Depreciation of plant	3,895.57	6,084.95
Interest on investment	3,985.22	1,756.15
Total cost steam generated	$87,422.61	$50,748.40
Steam generated, lb.	168,000,000	99,000,000
Cost steam per 1000 lb.	$0.52	$0.51
Evaporation per lb. coal, lb.	8.42	10.65
Combined furnace and boiler efficiency	62.5 (est.)	79.0 (48-hr. test.)

accounted steam from 40.7 to 8.42 per cent. During several quarterly periods this item has fallen to 7 per cent, which is remarkable, considering the extent of the distributing system. In 1920 (again referring to Table I) the evaporation, as calculated from venturi-meter readings on the mains, was 8.42 lb. per lb. of coal, and in 1924, this had increased to 10.65 lb. per lb. of coal, as calculated from flow-meter records. The combined furnace and boiler efficiency, as determined by a 48-hour test, was found to be 79.0 per cent, excluding the net heat recovered by the economizer equipment.

A wide variation in the distribution of steam is indicated by Table II, demonstrating the flexibility of a system in which the demand for process steam exceeds that for power generation alone. In 1920, the reciprocating prime movers used 25 per cent of the accounted live steam, and miscellaneous engines used another 18 per cent. These units exhausted against 5 lb. back pressure, which was maintained by bleeding live steam into the exhaust main. Thirty-three per cent of the live steam was used for factory heating. The 44,060,000 lb. of exhaust steam was fairly equally divided among the mixed-pressure turbine unit, feed water heating, factory heating and glycerine distillation. The mixed-pressure turbine is an excellent feature of this power plant, as increased capacity is available simply by operating the turbine on high pressure. For example, in soap boiling, which is intermittent, large quantities of live steam are required and at such times, part of the power load can be taken by the turbine operating on 5-lb. steam. In winter, on the other hand,

Table II—Comparative Distribution of Steam Before and After Installation of Steam Meters

(a) Live Steam Distribution, Lb.

	Quarter Ending Jan. 1, 1921; Steam Not Metered	Quarter Ending Jan. 3, 1925; Steam Metered
Steam-electric units	24,900,000	40,112,000
Other power units (pumps, compressors, fans, etc.)	17,650,000	19,205,000
Oil and fat distillation	7,250,000	1,917,000
Soap boiling	2,840,000	4,633,000
Glycerine distillation	6,190,000	3,756,000
Factory heating	33,470,000	12,905,000
Sold to tenant	.....	1,905,000
Miscellaneous processes	7,300,000	5,796,000
Total live steam accounted for, lb.	99,600,000	90,229,000
Total live steam unaccounted for, lb.	68,400,000	8,771,000
Total steam generated, lb.	168,000,000	99,000,000
Unaccounted for, per cent	40.7	8.85

(b) Exhaust Steam Distribution, Lb.

Mixed-pressure turbine unit	9,300,000	12,177,000
Feed water heating	11,510,000	1,819,000
Glycerine distillation	9,760,000	.....
Factory heating	13,490,000	27,455,000
Soap making	.....	2,337,000
Total exhaust steam consumed, lb.	44,060,000	43,788,000

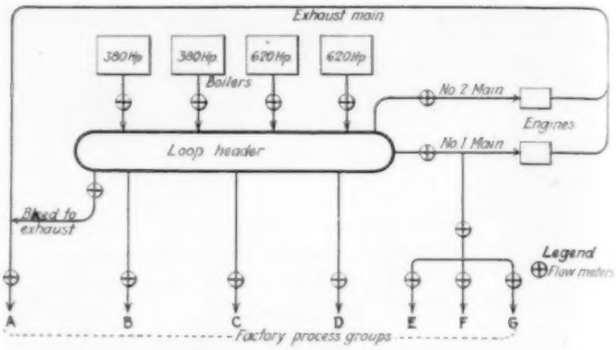


Fig. 3—Scheme of Flow Meter Installation
Eight of the meters in this installation measure individual boiler output and the flow in the steam mains; the others are in lines supplying process groups

when much exhaust steam is needed for heating, it can operate non-condensing. In 1924, we find that 66 per cent of the live steam was used in the engines, half of the exhaust from which went to the factory heating system. Comparatively little live steam was used for this purpose, and no exhaust steam was used for glycerine distillation.

The arrangement of the 15 flow meters is shown diagrammatically in Fig. 3. Eight of these meters, made by the Republic Flow Meters Company, form a remote control unit for the measurement of individual boiler output and of the flow in the live and exhaust steam mains. Fig. 2 shows the recording and integrating instruments, which are mounted on a panel convenient to the operating superintendent. A view of the indicating instrument, as mounted on the front of a 620-hp. Edge Moor boiler, is given in Fig. 1. The CO_2 recorders can be seen also. Seven other flow meters, made by the Bailey Meter Company, measure the steam used by the principal process groups. Thus far no attempt has been made to place meters in every one of the many manufacturing departments, some of which use little or no steam except for heating, and this expense is distributed quite logically on the basis of floor area.

It is obvious that the possibilities of improving operating economy through the installation of steam flow meters cannot be realized unless full use is made of the indicated and recorded data. To this end, the company has made a member of the engineering staff responsible for the maintenance of these instruments, and for the filing, tabulation, and analysis of the continuous daily graphic records. This plan has a number of commendable features, not the least of which is a preservation of desirable precision limits. The meters are inspected frequently and are cleaned and adjusted at regular intervals as insurance against possible inaccuracies.

Chromium Plating

In the article "Principles and Operating Conditions of Chromium Plating" by H. E. Haring in the August issue, the following legend should have appeared in Fig. 1, p. 694:

Curve	Current Density	Area	Type of Deposit
A	50 amp. per sq.ft. = 5.5 amp. per sq.dm.	1	"Burnt"
B	100 amp. per sq.ft. = 11 amp. per sq.dm.	2	"Bright"
C	200 amp. per sq.ft. = 22 amp. per sq.dm.	3	Scant, bluish

On electrolytic plates, curve *B* represents 200 amp. per sq.ft. = 22 amp. per sq.dm.

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By P. K. Frölich
Massachusetts Institute of Technology

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Readers' Views and Comments: Chromium Plating

To the Editor of Chem. & Met.:

Sir—We read with interest the article which appeared in the August, 1925, issue of *Chem. & Met.* entitled "Principles and Operating Conditions of Chromium Plating" by H. E. Haring, of the Bureau of Standards.

Mr. Haring and the Bureau are to be complimented on the thoroughness with which they approached the problem and on the results obtained.

We wish, however, to call attention to the fact that in U. S. Patent No. 1,496,845, granted to G. Grube and assigned to Metal & Thermit Corporation, chromium chromate is introduced as an effective constituent in electrolytes for chromium deposition by causing chromic acid to react with chromium hydroxide, the latter being present in excess sufficient to neutralize any free acid present other than chromic acid.

Mr. Haring points out in his paper that "* * * chromium carbonate is added to the baths. In the amount used used (7 gm. per liter or 1 oz. per gal.), it dissolves completely with effervescence." Basic chromium carbonate $CrO(CO_3)_2$ in the presence of chromic acid would be neutralized, CO_2 given off and chromium hydroxide would be the intermediate product formed. This then would form "chromium chromate" with the excess chromic acid and yield in effect exactly the same result as is claimed in the Grube patent. Written as hydrated and carbonated forms of Cr_2O_3, the analogous nature of the two compounds can be readily determined by examining the following formulas: $Cr_2O_3 \cdot 3H_2O$, and $Cr_2O_3 \cdot (CO_3)_2$.

No new constituent is being introduced into the electrolyte (the CO_2 evolved escaping as a gas). No new properties are given to the solution. The quality or characteristics of the metal deposited are in no way altered. The ultimate composition of the electrolyte is in effect exactly that claimed by Grube and covered by his aforementioned patent.

Metal & Thermit Corporation.
E. A. Beck.
New York City. Metallurgist.

The Plant Notebook

An Exchange for Operating Men

Concrete Tanks on Concrete Buildings

In the design of a concrete structure to house an industrial plant it is well to consider the possibility of utilizing floors or walls, or both, in the construction of concrete tanks. This possibility was seen by John Mason in the design of the Mason Byproduct Company's plant at Sausalito, Calif.; and a tank and a sump for cooling water were built at an exceedingly small additional expense. Moreover, the structures do not detract from the appearance of the building, as steel tanks usually do, being hardly noticeable.

The accompanying halftone (Fig. 1) shows the concrete roof of the main building, with the extension housing the stills in the distance. Fig. 2 shows how, by utilizing the walls of the still building and the roof of the main building, a tank was constructed by the addition of on'y three walls.

Dodging Unnecessary Cost in Loading Line Shafts

By Joseph E. Plumstead

Manager of Manufacturing, Jessup & Moore Paper Co., Wilmington, Del.

From time to time, we have had occasion to increase the load on old line shafts, so much so that at times we had a great deal of trouble with shaft breakage. When such breaks occurred, instead of putting in larger diameter shafts, which would have necessitated buying new pulleys and bearings, we installed nickel-steel shafts of the same diameter, with extremely satisfactory results. Probably many other mills have also done this; but it may not have been thought of by some and I submit the idea for what it is worth.

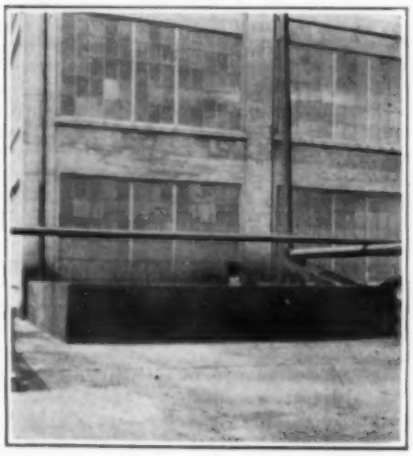


Fig. 2—Cooling Water Tank Constructed by Utilizing the Wall and Roof of the Building

Fig. 1—Concrete Roof of Main Building

Using Water Pressure to Repair a Collapsed Still

A quick and effective repair job was done at the alcohol plant of the Mason Byproducts Co., at Sausalito, California, by utilizing water pressure to expand a collapsed still boiling chamber.

The unit had been in operation for only a short time; and while adjustments were under way the still was being stopped and started, and emptied meanwhile. The inadvertent closing of a valve resulted in the formation of a vacuum in the copper boiling chamber, about 9 x 4 ft. in dimension, which completely collapsed. From the coppersmith's standpoint, a serious shutdown was considered inevitable, with removal of the vessel to the shops at San Francisco for re-shaping. The general manager, John Mason, however, decided to try the effect of ordinary city-main water pressure, and a fire hose was connected.

Leaks were disclosed and developed in abundance, in number facetiously compared to the quills of a porcupine. But sufficient pressure was maintained to counteract these losses, and the vessel slowly assumed its original shape. The oxy-acetylene torch was then brought into action and the job completed. The still was again in commission within about 24 hr. after the accident, and has since operated for over a year without giving trouble.

Developing a Spray Nozzle for Difficult Service

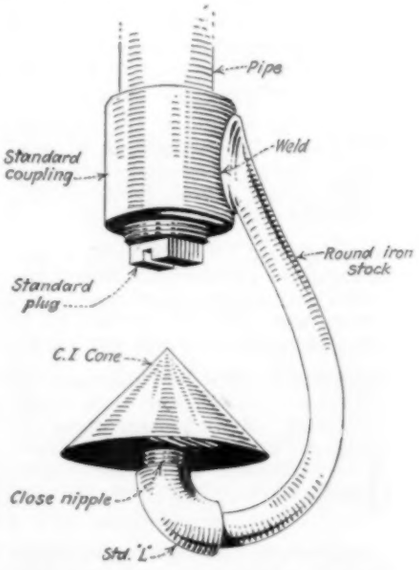
A large chemical plant carries on a process in which spraying is used that necessitated the development of a special spray nozzle, for none of those on the market would meet the conditions. In the process a solid hydrate in suspension is treated with an acid forming gas and during the reaction an insoluble precipitate is formed. The spray must be non-plugging and easily cleaned, because the insoluble materials have a marked tendency to plug up any openings or moving parts. The corrosive gases make necessary a rugged construction in which the parts are easily replaceable.

A spray was developed that gave satisfactory service. It is shown in the accompanying sketch. It is made of standard pipe fittings, except for the rod and cast iron cone. The welding called for can be easily done in any shop and the parts are easily replaced and are interchangeable. The particular advantage is a high nozzle velocity, a good atomizing action and ease of cleaning.

The cone is self-cleaning, due to the velocity of the liquid striking it. The reaction occurs largely in the air after the liquid has left the cone, rather than at the nozzle, as was the case with sprays employing a relatively low nozzle velocity. The power consumption for this type of spray was less than 50 per cent of the power required to operate some of the other types tried out and the life of the materials was much longer.

Protecting Electrical Equipment From Corrosive Dusts

The Detroit Rock Salt Co., Detroit, Mich., has recently equipped its mine and mill with electric motors and electrical control. All the control equipment is immersed in oil because of the highly corrosive action of salt dust suspended in the air. It was found practically impossible to keep this dust out by making the equipment dustproof because the dust is so extremely fine. Immersion in oil, however, has given the results desired.



Sketch of Spray Nozzle for Service with Clogging and Corrosive Materials

Equipment News

From Maker and User

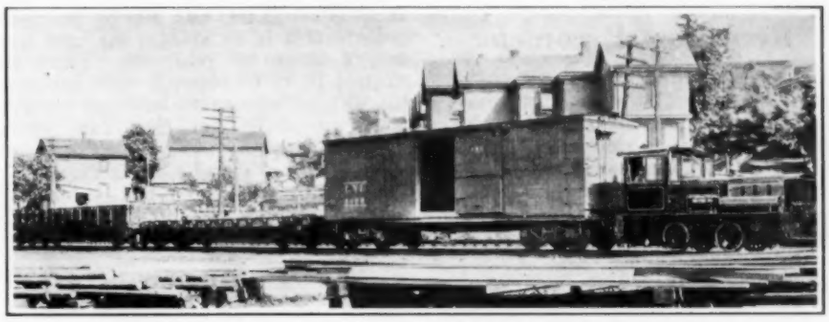
Gasoline Locomotive

A heavier type of gasoline locomotive, a 20 ton machine called model "HS-20," has been brought out recently by the Vulcan Iron Works, Wilkes-Barre, Pa.

This locomotive is designed along lines similar to the other heavy gasoline machines made by this company and closely follows steam locomotive practice. It is primarily designed for switching service on standard gage track, for which work it is furnished with M. C. B. automatic couplers with spring buffer and draft rigging arrangement in the bumpers.

Motive power is furnished by a 6 cylinder, 125 hp. motor of the heavy duty, industrial type, completely counter-balanced to avoid undue vibration. An engine-type governor is provided. Oiling is by force feed. Ignition is of the dual system type, with two spark plugs per cylinder. All other modern motor accessories to make this unit safe and easy to operate are also provided.

The transmission is of the constant-mesh-gear type, with jaw clutches. Air brakes are used. There are 4 speeds forward and 4 speeds reverse, geared from 2 to 15 miles per hour. Maximum drawbar pull is 12,000 lb.

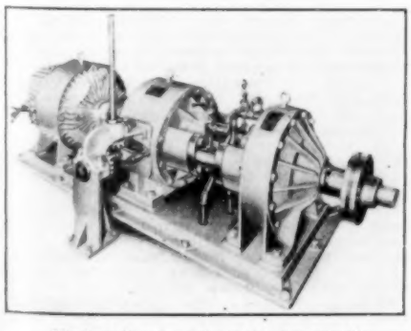


Heavy Duty Gasoline Locomotive in Operation in Factory Yard

Portable Mixer

A portable stirring or mixing unit, which is designed to clamp on the edge of a tank or any other type of open vessel, has recently been brought out by the New England Tank & Tower Co., Everett, Mass.

This unit consists of a ¼ hp. motor, mounted on top of the clamp in an adjustable manner. Direct connected to the motor shaft is a mixer shaft from 6 to 36 inches long with a propeller on its outer end. The body and clamp are made of duralumin, while the mixer shaft and propeller are of Monel metal. When desired, a heat insulation section is provided to prevent transmission of excess heat to the motor.



Hydraulic Speed Reducing Unit

Belt Lacing

A smaller size of "Flexo H. D." belt fasteners has been brought out by the Flexible Steel Lacing Co., Chicago, Ill. This size is for belts ¼ to $\frac{7}{16}$ in. thick, both conveyor and power transmission types. The new size is designated No. 1.

Rivet Set

Ingersoll-Rand Company, 11 Broadway, New York, N. Y., has produced a new rivet set for pneumatic hammers which is said to last longer than three, four or even more ordinary sets. This new set is called the "Jackset." It is made of a special alloy steel, which will stand a much greater degree of heat from hot rivets, without the temper becoming drawn. It is specially forged and then heat treated by a new process.

Electric Steam Boilers

A new line of small capacity electrically heated steam generators has recently been brought out by the Barnstead Still & Sterilizer Co., Boston, Mass. These boilers range from ½ to 2 boiler hp. (4 to 16 kw.) and operate up to 100 lb. gage. They are semi-portable, requiring only water, steam and blow-off connections to install. They are entirely automatic except for water feed, which can be made so if desired.

Speed Reduction Unit

A new speed reducer, made by the American Engineering Co., Philadelphia, Pa., uses a Hele-Shaw hydraulic pump and a Hele-Shaw hydraulic motor in place of gearing to accomplish the reduction. The use of hydraulic power is said to give this unit great power, silent and smooth operation and much flexibility of control. The efficiency is high as compared to a geared unit. Any desired ratio of speed reduction up to 850 to 1 can be obtained without stopping the motor.

Magnetic Separator

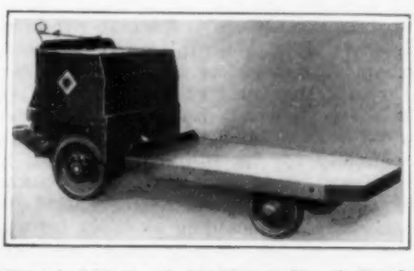
Dings Magnetic Separator Co., Milwaukee, Wis., has recently placed on the market a new separator for use with small, high speed grinders. It is of the trough type and is installed in the feed trough of the grinder. The magnetic coil is completely enclosed and is placed under the separator. The magnetic plate is placed in the bottom of the trough, where it holds any tramp iron that may pass down.

A pivoted gate mounted with a coil spring forms part of the bottom of the trough below the magnet. When the current is on, this gate is held closed. When the current is off, the spring opens the gate, the magnet lets go and the tramp iron discharges through the gate.

Electric Lift Truck

A heavy type of electric lift truck, suitable for use in plants that do not have smooth runways has recently been introduced by the Elwell-Parker Electric Co., Cleveland, Ohio. In addition to being designed for rough road conditions, other improvements have been embodied in this design.

The truck, shown in the accompanying picture, has a broad gage, front and rear both being 30 in. The front wheels are 15 in. diameter and the drive wheels are 22 in. diameter, with either 3½ in. or 4½ in. tread. These wheels have ball bearings. The differential has been improved and is now made up of steel forgings with Brown & Sharpe worm and wheel. A



Electric Lift Truck for Use on Rough Roads

new type of universal joint is used and the motor is equipped with ball bearings.

The platform of this truck is 72 in. long and 40 in. wide. It has a lift of 6½ in., from a height of 17 in. to one of 23½ in. This gives the clearances needed for rough service. The controller used is a new design with reverse drum.

Recording Pyrometer

A new recording pyrometer has just been placed on the market by the Brown Instrument Co., Philadelphia, Pa. This device is said to be the result of five years of research and embodies many new features not found in preceding instruments made by this company.

The case is a black enameled aluminum die-casting. The instrument is 15 in. high, 14 in. wide and 9 in. deep and uses a chart 7 in. wide. It makes a single record, a duplex record, or a multiple record with as many as 12 records on one chart.

Operation is on a frictionless principle in which a pointer swings freely and at intervals of 30 seconds is depressed on a carbon or inked ribbon, thus producing a mark on the chart. The marking ribbon and chart are sufficient for 60 days operation and no inking is required. The marking ribbon is above the chart and the mark is thus produced on the front of the chart where it shows clearly. The ribbon, on the single and duplex instruments, is moved back after each mark is made, so that the mark is immediately rendered visible.

A platen is provided so that notes can be recorded on the chart with pen or pencil. A glass knife edge located below the driving roll permits the paper to be torn off at any period desired. Such a torn-off strip will show the record up to two hours before tearing off.

An indicating scale with large figures readable from a distance is provided. The chart has rectangular coordinates and the record is straight across it, not curved.

Operating mechanism is a clock, electric if alternating current is available, and hand-wound otherwise. When the electric clock is used it requires but 4 watts current. The recording is done by a galvanometer and when the hinged frame is swung aside this galvanometer and also the recording chart mechanism, which is mounted on the frame, are fully accessible.

The chart speed can be readily changed. Standard speed is one inch per hour. By reversing 2 gears a speed of 4 inches per hour is obtained. Other speeds from ¼ inch to 6 inches per hour are available. With the standard speed, about 12 hours of chart travel is visible through the front of the case. A reroll attachment is furnished where desired which rolls the chart up automatically for its full length.

When used as a pyrometer, automatic cold junction compensation is incorporated, including an index for adjusting to the correct initial starting point on open circuit.

Speed Reducer

A speed reducing unit of the worm gear type has recently been brought out by the Boston Gear Works Sales Co., Norfolk Downs, Mass. This unit has a phosphor bronze gear and a hardened steel worm, both with ground teeth. The worm shaft is provided with ball thrust bearings at each end of shaft in addition to sleeve bearings. The gear shaft has sleeve bearings. Lubrication is by splash, the unit having a large oil reservoir. Sizes are from ¼ to 12 horsepower with ratios up to 50:1. These units have an overload capacity of 50 per cent for several hours, with a momentary overload capacity considerably greater.

Manufacturers' Latest Publications

American Blower Co., Detroit, Mich.—Bulletin No. 3506.—A catalog of type "E" steel plate exhaust fans.

Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.—1925-1927 edition of general catalog of electrical supplies, superseding that of 1923-1924, containing complete information about apparatus manufactured by this company or obtainable through it.

Paul O. Abbé, Inc., 71 Murray St., New York, N. Y.—Catalog I.—A condensed general catalog of machinery for crushing, cutting, grinding, pulverizing, mixing and sifting.

Standard Conveyor Co., North St. Paul, Minn.—A folder describing a heavy duty roller for gravity conveyor use where service conditions are rough.

Esterline-Angus Co., Indianapolis, Ind.—Bulletin No. 725.—A bulletin describing speed recording and indicating instruments.

Link-Belt Co., Chicago, Ill.—Book No. 720.—A catalog of the Peck Carrier, a conveyor of the pivoted bucket type for coal, ashes, cement, sand, ore, stone and similar materials.

Hills-McCanna Co., 2025 Elston Ave., Chicago, Ill.—A leaflet on Hills-McCanna "45," a high strength bronze for fabricating apparatus for oil refineries and similar services.

Midwest Air Filters, Inc., 100 E. 45th St., New York, N. Y.—Two new leaflets on air cleaning filters.

American Stainless Steel Co., Pittsburgh, Pa.—A booklet on stainless steel entitled "Stainless in the Home."

Aluminum Company of America, Pittsburgh, Pa.—Three new booklets; "Aluminum in the Chemical Industries," "Aluminum in the Rubber Industry," "Aluminum Paint," describing and illustrating these uses for aluminum.

Century Electric Co., St. Louis, Mo.—Bulletin No. 38.—A catalog of squirrel cage induction polyphase motors, Type "SC" from ½ to 75 horsepower.

Ferro Enamel Supply Co., Cleveland, Ohio.—A catalog of enamels, equipment and supplies used in ferro enameling, including information on processes and many interesting data.

New Jersey Foundry & Machine Co., 90 West St., New York, N. Y.—Catalog 106.—A catalog of portable and stationary elevators for material handling in all types of plants.

Engberg's Electric & Mechanical Works, St. Joseph, Mich.—Catalog No. 302.—A catalog of vertical, enclosed, self-oiling steam engines from 1 to 100 horsepower.

Jeffrey Mfg. Co., Columbus, Ohio.—Catalog No. 409.—A complete catalog of belt conveyors, giving details, specifications and prices and many installation pictures.

B. F. Sturtevant Co., Hyde Park, Boston, Mass.—A folder listing Sturtevant products for power plants and showing installations.

L. J. Wing Mfg. Co., 752 W. 13th St., New York, N. Y.—Bulletin No. 77.—A catalog of turbine and motor-driven blowers for forced draft for boilers, giving specifications and installation and operating information.

New Departure Mfg. Co., Bristol, Conn.—Bulletin No. 167FE.—A bulletin showing application of ball bearings to chaser grinder spindles and buffing and polishing lathe spindles.

American Blower Co., Detroit, Mich.—Form No. 3118.—A booklet describing the Venturafin method of heating for industrial plants.

The Bonnot Co., Canton, Ohio.—Bulletin No. 64.—A catalog of the "Unit-Air" ball mill, an apparatus for preparing pulverized coal for direct firing.

Barrett, Haentjens & Co., Hazleton, Pa.—A pamphlet describing the automatic operation of centrifugal pumps by the "Hazleton" automatic control system.

Patterson Foundry & Machine Co., East Liverpool, Ohio.—A folder dealing with pebble mills for paints, varnishes, enamels and lacquers.

Monitor Controller Co., Baltimore, Md.—A folder on controllers and starters for blower motors.

W. W. Sly Mfg. Co., Cleveland, Ohio.—A folder describing dust arresters for industries such as lime and cement manufacture.

The Norwalk Co., South Norwalk, Conn.—Catalog No. 32.—A catalog of multistage high pressure air and gas compressors for the gas and chemical industries.

Worthington Pump & Machinery Corporation, 115 Broadway, New York N. Y.—A folder dealing with equipment such as pumps, condensers, heaters, engines, meters, compressors, etc., used in power plants.

Connersville Blower Co., Connersville, Indiana.—Bulletins Nos. 6A and 13C.—The first of these describes primers for centrifugal pumps and also vacuum pumps for 12 to 22 ft. lifts. The second describes the "Victor" rotary positive gas pump for use in small gas plants, oil refineries, natural gas plants and chemical and other industrial plants.

Denver Fire Clay Co., Denver, Colo.—A folder describing various types of industrial furnaces built by this company.

F. J. Ryan & Co., Wesley Bldg., Philadelphia, Pa.—A loose leaf catalog of standard furnaces and furnace accessories for industrial heating.

Cleveland Worm & Gear Co., Cleveland, Ohio.—A leaflet describing type AT worm gear reduction unit.

Bridgeport Brass Co., Bridgeport, Conn.—A catalog describing "Phono-Electric" trolley wire and "Phono-Hi-Strength" wire.

The Dorr Co., 247 Park Ave., New York, N. Y.—Bulletin No. 11.—A new bulletin describing Dorr machinery for classification and washing and its installation and use.

Boston Gear Works Sales Co., Norfolk Downs, Mass.—A catalog of speed reduction units of various types.

Combustion Engineering Corporation, 43 Broad St., New York, N. Y.—Catalog AH-2.—New catalog of the "C-E" air heater for use in preheating the entering air of a furnace by means of the waste heat in the flue gases.

American Schaeffer & Budenberg Corporation, Brooklyn, N. Y.—Catalog No. 2500.—A new catalog of "Honeco" air operated controllers for the control of pressure, temperature, condensation, humidity, liquid level, time, dampers, etc.

Gilbert & Nash Co., Menasha, Wis.—Catalog of wire and felt guides for paper mills.

General Electric Co., Schenectady, N. Y.—Instructions No. 87000 E.—Instructions for installing, operating and maintaining switchboards, a 120 page book superseding 87000 D.

Conveyors Corporation of America, Chicago, Ill.—A booklet describing the ash and soot disposal system at the Milwaukee Sewerage Plant.

Oxweld Acetylene Co., 30 East 42nd St., New York, N. Y.—A pamphlet giving precautions to be observed and safe practices to be adopted by welders.

C. J. Tagliabue Mfg. Co., 18 Thirty-third St., Brooklyn, N. Y.—Catalog 905-B.—A new complete catalog of recording thermometers, hygrometers, psychrometers, time gages, pressures gages, etc., for all services.

Pennsylvania Pump & Compressor Co., Easton, Pa.—Bulletins Nos. 122, 123, 124.—Three bulletins, describing, respectively, aftercoolers, air compressors and vacuum pumps, and portable air compressors with gas engine drive.

Detroit Stoker Co., Detroit, Mich.—Bulletin No. 1018.—A catalog describing Detroit underfeed stokers and giving information on several installations.

Graver Corporation, East Chicago, Indiana.—Bulletin 101.—Bulletin describing the Jenkins cracking process for producing gasoline.

H. H. Robertson Co., Pittsburgh, Pa.—Bulletin No. 75.—A catalog of asbestos protected metal for roofing, sides and trim of industrial buildings.

Norton Co., Worcester, Mass.—Three booklets, one giving grinding wheel information; one describing grinding wheel stands, protection hoods and accessories; and the third describing type "S" motor driven grinding wheel stands.

American Blower Co., Detroit, Mich.—Form No. 1929.—Dealers pocket price book of fans and blowers of all types.

Patents Issued Aug. 4 to Sept. 1, 1925

Pulp and Paper

Paper Making. Fred Barnes, Shawinigan Falls, Quebec, Canada.—1,549,103.

Paper Product and Process of Making the Same. Lawrence V. Redman and Harold C. Cheetham Chicago, Ill., assignors to Bakelite Corporation, New York, N. Y.—1,551,428.

Pulp Thickener. George K. Walker, Glens Falls, N. Y.—1,550,293.

Pulp-Screening Machine. Anton J. Haug, Nashua, N. H.—1,551,953.

Press Roller for Pressing Out Water from Wood Pulp, Cellulose, and the Like. Rudolph Ernst Wagner, Karlstad, Sweden, assignor to Aktiebolaget Karlstads Mekaniska Verkstad, Karlstad, Sweden.—1,552,-098.

Apparatus for Drying Paper. Hugo H. Hanson, Boston, Mass., and Wilfred A. Wylde, Bangor, Me., assignors to Eastern Manufacturing Company, Boston, Mass.—1,550,695.

Process of Treating Waste Magnesium Monosulphite Cooking Liquors. Viggo Drewsen, Larchmont, N. Y., assignor to West Virginia Pulp and Paper Company, New York, N. Y.—1,549,189.

Process for Sizing Paper in the Pulp. Josef Pelzer, Munich, Germany.—1,550,632.

Process of Utilizing Waste Sulphite Liquor. Guy C. Howard, Seattle, Wash.—1,551,882.

Method of and Apparatus for Molding Pulp Articles. Arthur D. Little, Brookline, Mass., assignor to Arthur D. Little, Incorporated, Cambridge, Mass.—1,551,257.

Rubber and Synthetic Plastics

Process of Treating Latex and Article Therefrom. Merwin C. Teague, Elmhurst, N. Y., assignor to American Rubber Company, East Cambridge.—1,550,466.

Crude Rubber and Process of Producing the Same. Russell Hopkinson, Elmhurst, N. Y., assignor to General Rubber Company, New York, N. Y.—1,550,319.

Process of Manufacturing a Rubberized Fibrous Composition. Paul Beebe, Akron, Ohio, assignor to The Goodyear Tire & Rubber Company, Akron, Ohio.—1,549,729.

Method of Vulcanizing Rubber. Thomas W. Miller, Ashland, Ohio.—1,551,042.

Phenol-Aldehyde Condensation Product and Process of Producing It. George Wellington Miles, Boston, Mass., assignor to The American Cellulose & Chemical Manufacturing Company, Ltd., New York, N. Y.—1,549,888.

Formed Viscose. Josef Huber, Dessau, in Anhalt, and Paul Eckert, Dessau-Ziebigk, in Anhalt, Germany, assignors to Actien Gesellschaft für Anilin Fabrikation, Berlin, Germany.—1,550,360.

Manufacture of Viscose Films, etc. Jaques Edwin Brandenberger, Neuilly-sur-Seine, France.—1,548,864.

Petroleum Refining

Method of Obtaining Gasoline and Other Low-Boiling-Point Distillates from Heavier Hydrocarbons. Arthur D. Smith, Arkansas City, Kans.—1,550,115.

Process of Treating Petroleum Oils. Richard F. Davis, El Segundo, Calif., assignor to Standard Oil Company, San Francisco, Calif.—1,551,806.

Dephlegmator. Samuel J Dickey, Los Angeles, Calif., assignor to General Petroleum Corporation.—1,549,068.

Method of Treating Oil. Fred W. Manning, New York, N. Y., assignor to Manning Refining Equipment Corporation.—1,552,072.

Process for Treating Hydrocarbon Oils. Robert T. Pollock, Boston, Mass., assignor to Universal Oil Products Company, Chicago, Ill.—1,550,568.

Process for Treating Hydrocarbons. Carbon P. Dubbs, Wilmette, Ill., assignor to Universal Oil Products Company, Chicago, Ill.—1,551,090.

Treatment of Cracked Oils. Benjamin T. Brooks, Sound Beach, Conn., assignor to The Mathieson Alkali Works, Inc., New York, N. Y.—1,550,673.

Process for Cracking Petroleum Oil. Gustav Egloff and Harry P. Benner, Independence, Kans., assignors to Universal Oil Products Company, Chicago, Ill.—1,550,892.

Process for Cracking Oil. Carbon P. Dubbs, Wilmette, Ill., assignor to Universal Oil Products Company, Chicago, Ill.—1,549,352.

Process for Treating Petroleum Oil. Carbon P. Dubbs, Wilmette, Ill., assignor to Universal Oil Products Company, Chicago, Ill.—1,550,607.

Apparatus for Neutralizing or Decolorizing Oils. Paul W. Prutzman, Los Angeles, Calif., assignor to General Petroleum Corporation.—1,551,909.

Process and Apparatus for Distilling Fuel Oil or Gas Oil. Lewis P. Litzinger and Peter F. Conerty, Butler, and William Snodgrass, Bruin, Pa.—1,551,410.

Purification of Mineral Oils. Albert Ernest Dunstan, Sunbury-on-Thames ,England.—1,549,469.

Tank for Separating Gas and Water from Oil. Felbert A. Ray, Wichita Falls, Tex.—1,551,329.

Lubricating Oil and Process of Producing Same. Warren F. Faragher and Robert W. Henry, Pittsburgh, and William A. Gruse, Wilkinsburg, Pa., assignors to Gulf Refining Company, Pittsburgh, Pa.—1,550,-608.

Lubricating Compound. Frederick T. Manley, Houston, Tex., assignor to The Texas Company, New York, N. Y.—1,550,-912.

Oil-Shale Retort. Robert H. Crozier, Rangoon, Burma.—1,551,941.

Combustion and Refractories

Refractory and Method of Making the Same. Karl P. McElroy, Washington, D. C., assignor to Allen S. Davison Company, Pittsburgh, Pa.—1,551,201.

Process for Making Combustible Gas. Hermann Mehner, Berlin-Charlottenburg, Germany.—1,550,558.

Charcoal Briquette and Process of Making Same. Walter R. Leuenberger A. and William T. Dumbleton, Tacoma, Wash., assignors to Carbon Briquet Company.—1,550,034.

Oil Burner. Edward J. Hemmer, Enid, Okla.—1,548,313.

Hydrocarbon Burner. John C. Higgins, San Diego, Calif.—1,548,316.

Oil Burner. John P. Lewis, Brooklyn, N. Y.—1,548,719.

Oil Burner. Walter B. Fogh, Seattle, Wash., assignor to Fogh Manufacturing Company, Seattle, Wash.—1,549,861.

Crude-Oil Burner. Frederick W. Scheifele, Audubon, N. J.—1,548,389.

Oil Burner. August Behrsin, Los Angeles, Calif.—1,549,404.

Inorganic Processes

Sulphur-Containing Composition and Method of Making the Same. William Hoffman Kobbe, New York., assignor to Texas Gulf Sulphur Company, Bay City, Tex.—1,551,573.

Colloidal-Fungicidal Sulphur Composition. Henry W. Banks, 3d, Noroton, Conn., assignor to Loomis, Stump & Banks, New York, N. Y.—1,550,650.

Method of Purifying Sulphur. Carl Marx, Wyoming, N. J., assignor to Union Sulphur Company.—1,552,217.

Method of Preparing Sulphur in Colloidal Form. Chauncey C. Loomis, Yonkers, and Horace E. Stump, Brooklyn, N. Y., assignors, by mesne assignments, to the Hevea Corporation.—1,549,886.

Insecticide. Ruric C. Roark, Baltimore, Md., assignor to General Chemical Company, New York, N. Y.—1,549,220.

Producing Aluminum Compounds. James A. Whittington, Chicago, Ill.—1,549,398.

Process of Reducing Alumina. Charles E. Parsons, New York, N. Y., and Samuel Peacock, Wheeling, W. Va., assignors to Metal Research Corporation, New York, N. Y.—1,551,615.

Producing Aluminum Fluoride-Alkali-Metal Fluoride Double Compounds Practically Free from Iron. Heinrich Specketer, Griesheim-on-the-Main, Julius Söll Schwanheim-on-the-Main, and Robert Bilfinger Griesheim-on-the-Main, Germany, assignors to Chemische Fabrik Griesheim-Elektron, Frankfort-on-the Main, Germany.—1,548,-639.

Process for Producing Aluminum Chloride. Frank W. Hall, Port Arthur, Tex., assignor to The Texas Company, New York, N. Y.—1,549,766.

Pulverulent Copper Sulphate and Process of Producing Same. Lester A. Bunds, Santa Clara, Calif., assignor to San Jose Spray Mfg. Co., San Jose, Calif.—1,551,867.

Process of Recovering Absorbable Constituents from Gas Streams. Arthur B. Ray, Bayside, N. Y., assignor to Carbide and Carbon Chemicals Corporation.—1,548,-280.

Process for the Removal of Carbon Bisulphide from Gas. John Morris Weiss, New York, N. Y.—1,549,426.

Process of Manufacturing Nitric Acid. Charles William Cuno, Webster Groves, Mo.—1,552,117.

Plaster of Paris and Method of Making the Same. Robert Seaver Edwards, Brookline, Mass., assignor to Rumford Chemical Works, Providence, R. I.—1,548,358.

Process of Making Amorphous Artificial Calcium Carbonate. William H. Alton, New York, N. Y., assignor, by mesne assignments, to A. C. Battelle, Chicago, Ill.—1,552,024.

Method of Calcining Alkaline-Earth Carbonates. Hermann Mehner, Berlin-Charlottenburg, Germany.—1,550,557.

Method for Calcining Crude Lithopone. August Sonnin Krebs, Wilmington, Del., assignor to Krebs Pigment & Chemical Company, Newport, Del.—1,551,197.

Art of Making Lithopone. William R. Macklind, George C. McCarten, and William Sydney Stevens, Chicago, Ill., and Edward C. Holton and Henry J. Hain, Cleveland, Ohio, assignors to The Sherwin-Williams Company, Cleveland, Ohio.—1,550,271.

Salt Manufacture. James E. Nash, Silver Springs, N. Y., assignor to Worcester Salt Company, New York, N. Y.—1,549,018.

Antimony Compound. Hans Schmidt, Oberloessnitz, near Dresden, Germany, assignor to Chemische Fabrik von Heyden, Radebeul-Dresden, Germany.—1,549,154.

Alloy of Lead and Alkaline Earth Metal. Walther Mathesius, Charlottenburg, Germany.—1,549,137.

Production of Material for Catalysts. Carleton Ellis, Montclair, N. J.—1,548,872.

Process for the Reduction of Catalysts. Hans Harter, Wurzburg, Germany, assignor to Albert T. Otto & Sons, New York, N. Y.—1,550,805.

Organic Processes

Explosive and Process of Making Same. Gustav Egloff, Chicago, Ill., assignor to Universal Oil Products Company, Chicago, Ill.—1,551,650.

Explosive. Jacob Ehrlich, Belleville, N. J., assignor to Verona Chemical Co., North Newark, N. J.—1,550,064.

Explosive and Method of Manufacturing Same. Edward M. Werner, Cleveland, Ohio, assignor to The Rockburst Explosives Company, Cleveland, Ohio.—1,550,639.

Method for Preparing Propellent Powder. George C. Hale and Fredrich Olsen, Dover, N. J.—1,550,960.

Green-Blue Dyestuffs of the Triphenyl Methane Series, Fast to Alkali. Richard Gesing and Rudolf Reyher, Offenbach-on-the-Main, Germany, assignors to Chemische Fabrik Greisheim-Elektron, Frankfort-on-the-Main, Germany.—1,550,534.

Process of Producing a Dyestuff Intermediate. Lincoln M. Shafer, Irvingtoh, N. J., assignor to Lower Manufacturing Company, Inc., Newark, N. J.—1,550,749.

Triazine Azo Dyestuffs. Gerald Bonhote, Basel, Switzerland, assignor to Society of Chemical Industry in Basle, Basel, Switzerland.—1,549,901.

Azo Dyestuffs and Process of Making Same. Hermann Wagner, Hochst-on-the-Main, Germany, assignor, by mesne assignments, to Grasselli Dyestuff Corporation, New York, N. Y.—1,549,822.

Quinonimide Dyestuffs and the Process of Making the Same. Arthur George Green, Kenneth Herbert Saunders, and Ernest Bryan Adams, Manchester, England.—1,551,147.

Production of Quinizarine Green. Harold T. Stowell, Buffalo, N. Y., assignor to National Aniline & Chemical Co., Inc., New York, N. Y.—1,548,768.

Production of Dyestuffs Containing Chromium. Fritz Straub, Basel, Switzerland, assignor to The Society of Chemical Industry in Basle, Basel, Switzerland.—1,551,073.

Process for the Production of New Derivatives of the Arylides of 2.3 Hydroxynaphthoic Acid. Georg Kalischer, Mainkur, near Frankfort-on-the-Main, and Karl Keller, Frankfort-on-the-Main, Germany, assignors to Leopold Cassella & Co. Gesellschaft mit beschränkter Haftung.—1,552,058.

Process of Producing Vat Dyestuffs of the Perylene Series and the Products Obtainable Thereby. Karl Schirmacher and Wilhelm Eckert, Hochst-on-the-Main, Germany, assignors to Farbwerke vorm. Meister Lucius & Brüning, Hochst-on-the-Main, Germany.—1,551,849.

Cyanuric Intermediate Products and Process of Making Same. Hermann Fritzsche and Paul Schaedeli, Basel, Switzerland, assignors to Society of Chemical Industry in Basle, Basel, Switzerland.—1,551,095.

Process of Preparing Wood, Cellulose, and Other Substances for the Absorption of Preservatives of Coloring Matter. Carl Schantz, Freiburg, Baden, Germany, assignor to Gebr. Himmelsbach Aktiengesellschaft, Freiburg, Baden, Germany.—1,550,-395.

Process of Dyeing Cellulose Acetates. Rene Clavel, Basel, Switzerland.—1,549,906.

Cellulose-Ether Solvent and Composition. Edward S. Farrow, Jr., Rochester, N. Y., assignor to Eastman Kodak Company, Rochester, N. Y.—1,548,938.

Process for the Manufacture of Artificial Silk and Other Products from Cellulose Esters. Emile Bindschelder, Philadelphia, Pa., and George Juer, Hopewell, Va., assignors to Tubize Artificial Silk Company of America.—1,551,791.

Manufacture of Cellulose-Acetate Artificial Silk. Harry S. Mork, Brookline, and Charles F. Coffin, Jr., Watertown, Mass., assignors, by mesne assignments, to Lustron Company, Inc., Boston, Mass.—1,551,112.

Cellulose-Acetate Composition. Hans T. Clarke, Rochester, N. Y., assignor to Eastman Kodak Company, Rochester, N. Y.—1,548,932.

Production of Alcohols. Robert B. MacMullin and Ralph E. Gegenheimer, Niagara Falls, N. Y., assignors to The Mathieson Alkali Works, Inc., New York, N. Y.—1,549,779.

Fermentation Process for Producing Acetone and Butyl Alcohol. George W. Freiberg, Terre Haute, Ind., assignor to Commercial Solvents Corporation, Terre Haute, Ind.—1,551,550.

Production of Diacetone Alcohol. William J. Edmonds, Terre Haute, Ind., assignor to Commercial Solvents Corporation, Terre Haute, Ind.—1,550,792.

Process for the Manufacture of Alcohols and Acetone. Edward Halford Strange, Holborn, London, England.—1,550,928.

Manufacture of Acetone and Butyl Alcohol by Fermentation. Eloi Ricard, Melle, France, assignor, by mesne assignments, to Commercial Solvents Corporation, Baltimore, Md.—1,550,746.

Process of Producing Glycerol by Fermentation. Frank A. McDermott, Wilmington, Del., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del.—1,551,997.

Butyraldehyde Composition. Charles Bogin, Terre Haute, Ind., assignor to Commercial Solvents Corporation, Terre Haute, Ind.—1,550,869.

Higher Condensation Products of Acetaldehyde and Process for Making the Same. Clarence J. Herrly, Pittsburgh, Pa., assignor to Carbide and Carbon Chemicals Corporation.—1,549,883.

Production of 3-Nitrophthalic Acid. Edwin R. Littmann, Terre Haute, Ind., assignor to Commercial Solvents Corporation, Terre Haute, Ind.—1,549,885.

Stabilized Styrol Composition and Process for making the Same. Iwan Ostromislensky and Morris G. Shepard, New York, N. Y., assignors to The Naugatuck Chemical Company, Naugatuck, Conn.—1,550,323.

Process of Making Thioureas. William J. Kelly and Claude H. Smith, Akron, Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio.—1,549,720.

Process of Manufacturing Diphenylamine. Arthur Lachman, San Francisco, Calif.—1,549,136.

Process for the Recovery of Ammonia and Other Valuable Chemicals from Waste Denitration Liquors. Emile Bindschedler, Lansdowne, Pa., assignor to Tubize Artificial Silk Company of America.—1,548,345.

Process for the Production of a Fertilizer Containing Potassium and Nitrogen. Birger Fjeld Halvorsen and øystein Ravner, Christiania, Norway, assignors to Norsk Hydro-Elektrisk Kvaelstofaktieselskab, Solligaten 7, Christiania, Norway.—1,551,824.

Oil-and-Fat-Soluble Acridinium Salts. Louis Benda, Mainkur, near Frankfort-on-the-Main, Germany, assignor to Leopold Cassella & Co. Gesellschaft mit beschränkter Haftung.—1,550,420.

Method of Refining Castor Oil. Adelbert William Harvey, Pittsburgh, Pa., assignor to E. R. Squibb & Sons, New York, N. Y.—1,548,838.

Mercury Derivatives of Phthalein and Method of Preparing Same. Edwin C. White, Baltimore, Md.—1,549,942.

Allyl Arsonic Acid and Its Compounds and Process of Making the Same. Ernst Preiswerk and Heinz Moritz Wüest, Basel, Switzerland, assignors to The Hoffman-La Roche Chemical Works, New York, N. Y.—1,549,503.

Process of Making Neo-Arsphenamines. Paul George Dohr, Yonkers, N. Y., assignor, by mesne assignments, to Phillip A. Kober, Hastings-on-Hudson, N. Y.—1,549,465.

Alkaminesters of the P-Aminobenzoic Acids and Process of Making Same. Otto Eisleb, Hofheim, Germany, assignor to Farbwerke vorm. Meister Lucius & Brüning, Hochst-on-the-Main, Germany.—1,550,350.

Process of Recovering Tannin. Guy C. Howard, Seattle, Wash.—1,551,881.

Process for Producing Compositions for Purifying Acetylene and Other Gases. Albert Hermann, Rheinfelden, Germany.—1,551,878.

Process of Synthesizing Lead Tetra-Alkyls. Ki Williams, Carneys Point, and Herbert W. Daudt, Penns Grove, N. J., assignors to E. I. du Pont de Nemours & Company, Wilmington, Del.—1,550,940.

Tanning Material. Oskar Spengler and Alfred Thurm, Dessau in Anhalt, Germany, assignors to Actien Gesellschaft für Anilin Fabrikation, Berlin, Germany.—1,550,589.

Preparation of Arylthioglycollic Acids. Asa Willard Joyce, Newark, N. J., assignor to The Chemical Foundation, Incorporated, New York, N. Y.—1,550,075.

Process and Apparatus for the Production of Carbon Disulphide from Its Elements. Philipp Siedler, Griesheim-on-the-Main, Germany, assignor to Firm Chemische Fabrik Griesheim-Elektron, Frankfort-on-the-Main, Germany.—1,549,812.

Process of Making Benzoic Acid. Herbert W. Daudt, Penns Grove, N. J., assignor to E. I. du pont de Nemours & Company, Wilmington, Del.—1,551,373.

Cholesterin and Method of Manufacture. John P. Shepherd, Chicago, Ill., assignor, by mesne assignments, to Shepherd Chemical Company.—1,548,216.

Manufacturing Pure Anthracene and Pure Carbazol. Leopold Weil, Hamburg, Germany.—1,548,920.

Highly-Active Charcoal. Heinz Thienemann, Leverkusen, near Cologne-on-the-Rhine, Germany, assignor to Farbenfabriken vorm. Friedr. Bayer and Co., Leverkusen, near Cologne-on-the-Rhine, Germany.—1,551,074.

Method of Making Aldehyde Ammonia. Frederick W. Skirrow and George O. Morrison, Shawinigan Falls, Quebec, Canada, assignors, by mesne assignments, to Canadian Electro Products Company, Limited, Montreal, Quebec, Canada.—1,551,176.

Process of Making Alkali-Metal Compounds of Arsenophenols. Alfred E. Sherndal, New York, N. Y., assignor to Herman A. Metz, New York, N. Y.—1,550,109.

Modified Casein and Process of Making Same. Henry V. Dunham, Mount Vernon, N. Y.—1,551,471.

Process of Extracting or Recovering Alkaloids. William H. Volck, Watsonville, Calif.—1,548,566.

Electrolytic Cells

Battery. Francis W. Dane, Hamilton, Mass., assignor to Luthy Storage Battery Corporation, Boston, Mass.—1,549,748.

Battery. Irvin W. Myers and Creed M. Chorpening, Connellsville, Pa.—1,549,371.

Battery. Walter B. Schulte, Madison, Wis., assignor to Burgess Battery Company, Madison, Wis.—1,548,635.

Battery. Marcel Verron, Paris, France, assignor to General Electric Company.—1,550,188.

Electric-Battery Element. Serge Apostoloff, New York, N. Y.—1,551,359.

Dry Cell. Cyril P. Deibel, Lakewood, Ohio, assignor to The Twin Dry Cell Battery Company, Cleveland, Ohio.—1,552,396.

Dry Cell. William F. Hendry, Ossining, N. Y., assignor to Manhattan Electrical Supply Company, Inc., New York, N. Y.—1,549,120.

Dry Cell. Raymond C. Benner, Fremont, Ohio, assignor to National Carbon Co. Inc.—1,549,126.

Hermetically-Sealed Dry Cell. Raymond C. Benner, Fremont, Ohio, assignor to National Carbon Company, Inc.—1,549,851.

Electrode for Electrolytic Decomposition Apparatus. Carl Fredrik Holmboe, Riis, near Christiania, Norway, assignor to De Nordiske Fabriker De-No-Fa Aktieselskab, Christiania, Norway.—1,548,840.

Electrolytic Apparatus. Carl Fredrik Holmboe, Riis, near Christiania, Norway assignor of one-half to A/S de Nordiske Fabriker De-No-Fa, Christiania, Norway.—1,548,362.

Chemical Engineering Equipment

Drying Machine. Bertrand A. Parkes, Philadelphia, Pa., assignor to The Philadelphia Drying Machinery Company, Philadelphia, Pa.—1,549,726.

Drier. Stanley Hiller, San Jose, Calif., assignor to Stanley Hiller, Inc., San Jose, Calif.—1,551,152.

Drier. Henry Sieben, Kansas City, Mo.—1,548,218.

Tunnel, Furnace, Kiln, Oven, and the Like. Henri Francart, Tongres, Belgium.—1,549,481.

Art of Evaporation, Concentration, or Desiccation. Walter H. Dickerson, New York, N. Y., assignor to Industrial Waste Products Corporation, Dover, Del.—1,548,665.

Process of and Apparatus for Drying Material by Means of Fire Gases. Georg Müller, Frankfort-on-the-Main, Germany, assignor to American Lurgi Corporation, New York, N. Y.—1,551,965.

Drier. Charles C. Trump, Syracuse, N. Y.—1,550,992.

Evaporating Apparatus. Joshua R. Ray and Thomas Ray, Manistee, Mich., assignors to Ray Bros. Corporation, New York, N. Y.—1,548,063.

Rotary Kiln. Edward G. Stone, Hobart, Tasmania, Australia.—1,550,591.

Method and Means for Drying by Air and Other Gaseous Medium. William G. R. Braemer, Cranston, R. I., assignor to General Fire Extinguisher Company.—1,550,422.

Heat Exchanger. Thomas E. Murray, Brooklyn, N. Y.—1,548,158.

Oil Heater. John E. Bell, Brooklyn, N. Y., assignor to Power Specialty Company, New York, N. Y.—1,548,343.

Heat Exchanger. Roy E. Hanson, Huntington Park, Calif.—1,551,029.

Oil Cooler. Russell C. Jones, Bronxville, N. Y., assignor to The Griscom Russell Company, New York, N. Y.—1,549,489.

Gyratory Crushing Machine. William S. Weston, Columbia, S. C., assignor to Weston and Brooker, Engineers, Columbia, S. C., a Partnership composed of W. S. Weston, T. I. Weston, and B. O. Brooker.—1,549,641.

Crushing Mill. Arthur C. Daman, Denver, Colo.—1,550,013.

Crushing Apparatus. Olav Eskil Jorgensen, Forest Hills, N. Y., assignor, by mesne assignments, to Allis-Chalmers Manufacturing Company, Milwaukee, Wis.—1,549,555.

Gas Purification. Harry F. Smith, Dayton, Ohio, assignor to The Gas Research Company, Dayton, Ohio.—1,548,288.

Purifier. Harry F. Smith, Dayton, Ohio, assignor to The Gas Research Company, Dayton, Ohio.—1,549,158.

Gas Apparatus. Leland L. Summers, New York, N. Y.—1,549,160.

Deaerating Apparatus. John R. McDermet, Jeannette, Pa., assignor to Elliott Company, Pittsburgh, Pa.—1,552,071.

Apparatus for Manufacturing Combustible Gas. Edward M. C. McAlpine, Chicago, Ill.—1,550,273.

Air Conditioning and Distributing Apparatus. Alfred E. Stacey Jr., Essex Fells, N. J., assignor to Carrier Engineering Corporation, Newark, N. J.—1,550,714.

Method of and Machine for Homogenizing Liquids. John M. Colony, Newton Center, Mass.—1,550,882.

Electrostatic Separation. Fred R. Johnson, Arlington, Mass., assignor to Huff Electro-static Separator Company, Arlington, Mass.—1,551,397.

Liquefaction and Separation of the Constituents of Gaseous Mixtures. Claude C. Van Nuys, New York, N. Y., assignor to Air Reduction Company, Inc.—1,548,860.

Apparatus for Filtering and Softening Water. Martin F. Newman, Oakmont, Pa., assignor to Wm. B. Scaife & Sons Company, Oakmont, Pa.—1,548,160.

Sledge Mill. Thomas J. Sturtevant, Wellesley, Mass., assignor to Sturtevant Mill Company, Boston, Mass.—1,553,293.

Crushing Concave and Mantle. Edgar B. Symons, Los Angeles, Calif., assignor to Symons Brothers Company, Milwaukee, Wis.—1,552,458.

Pneumatic Dust Collecting and Conveying Apparatus. Joseph E. Georgia, Snoqualmie Falls, Wash.—1,552,553.

Sludge Distributor for Centrifugal Separators. Gustav ter Meer, Hannover-Linden, Germany.—1,552,564.

Multiple Effect Evaporating Apparatus. John F. Kirgan, Phillipsburg, N. J., assignor to Ingersoll-Rand Company, Jersey City, N. J.—1,552,562.

Method of Softening Water. Algernon R. Burnette, New York, N. Y., assignor to A. R. Burnette Corporation.—1,553,067.

Method of and Apparatus for Enameling. Conrad Dressler, Cleveland, Ohio, assignor to American Dressler Tunnel Kilns, Inc., Cleveland, Ohio.—1,552,475.

Valve. Frank A. Warter, Woodbridge, N. J., assignor of one-half to Charles Anness, Woodbridge, N. J.—1,553,056.

Carboy Box. George H. Tozier, Rochester, N. Y., assignor to Eastman Kodak Company, Rochester, N. Y.—1,552,809.

Preheater for Stills. Henry A. Hills, Grand Rapids, Mich.—1,552,433.

These patents have been selected from the latest available issues of the "Official Gazette" of the United States Patent Office because they appear to have pertinent interest for "Chem. & Met." readers.

Complete specifications of any United States patent may be obtained by remitting 10c. to the Commissioner of Patents, Washington, D. C.

News of the Industry

Symposium and Technical Papers To Feature A. E. S. Meeting

A number of technical papers of outstanding importance and interest will be presented at the fall meeting of the American Electrochemical Society, to be held this year at Chattanooga, Tenn., on September 24th, 25th, and 26th. The symposium will be in charge of H. C. Parmelee, and will be on the subject "The Relation of Electrochemistry to the Fertilizer Industry." A round-table discussion on "Electric Ferro Alloys" will also be a feature. Robert Trumbull will be chairman.

Program of Papers

The following are some of the papers which will be read: "Notes on the Plating of Chromium on Steel" by George M. Enos; "Some Electrical Properties of Copper-Nickel-Manganese Alloys" by Norman B. Pilling; "Some Phenomena in the Electric Arc Process of Nitrogen Fixation" by S. Karrer; "The Fixation of Atmospheric Nitrogen" by J. M. Braham; "The Development of Fertilizer Practice" by R. O. E. Davis; "The Protective Value of Nickel Plating" by C. T. Thomas and W. Blum; "The Use and Preparation of Concentrated Fertilizers" by William H. Ross; "Observations on the Rare Earths: The Concentration of Praseodymium Material and the Preparation and Properties of Metallic Praseodymium" by John Wierda with H. C. Kremers; "Effect of Nitrates on Current Efficiency of Plating Solutions" by P. A. Nichol and O. P. Watts; "The Equilibrium of the Series Cryolite-Alumina" by G. A. Roush and M. Miyake; "Static Potentials of Copper in Solutions of Copper Cyanide in Sodium Cyanide and in Potassium Cyanide, and of Zinc in Solutions of Zinc Cyanide in Sodium Cyanide" by W. M. Walker, J. H. Sorrels and J. M. Breckenridge; "A Laboratory High Frequency Vacuum Furnace" by J. R. Cain and A. A. Peterson; "The Development of Volatilization Methods for the Manufacture of Phosphoric Acid" by K. D. Jacob; "The Manufacture of Sodium Nitrite by the Arc Process" by H. K. Benson; "An Electrochemical Method for Estimating the Corrosion of Iron and Steel" by H. Beeny.

Saturday, Sept. 26, will be spent in an inspection visit at Muscle Shoals. This will be timely, as the Wilson Dam has just been completed. Headquarters for the Society will be at the Signal Mountain Hotel. Paul J. Kruesi is chairman of the local committee of arrangements.

Commercial Survey Made of Philadelphia District

As the first of a series of market analyses to be published by the Department of Commerce, announcement has been made that a commercial survey of the Philadelphia marketing area has been completed. The general economic background of the territory whose chief commercial center is Philadelphia is outlined; the extent of its influence charted; and the factors determining the purchasing power of the population sectionally and by races and occupational classes, as well as the more intangible buying habits which cause merchandising abnormalities, are discussed.

Hoover Plans for Action Against Foreign Monopolies

With the approach of another session of Congress, Secretary Hoover has renewed his plea for some form of counter action against foreign monopolies which exact unreasonable profits from American consumers. Extension of the Webb-Pomerene laws to imports so as to allow American buyers to present a solid front to a foreign combine is regarded by Secretary Hoover as the most practical step that could be taken, but he makes it clear that he will go along with any other proposition calculated to get results. He feels, however, that when Americans, because of manipulation, are forced to pay an additional $82,000,000 in a single year for coffee alone, self-defense in some form should be forthcoming.

North American Co. Plant for Distillation of Coal

The International Combustion Engineering Corp. has contracted with the North American Co. to construct plants for low temperature distillation of coal which will greatly reduce, it is said, the fuel cost of the North American's electric power stations.

The initial plant will have a capacity of 210 tons per day and will be erected at the Lakeside plant of the Milwaukee Electric Railway and Power Co., a subsidiary. Construction of this plant will begin at once. The new system distills the pulverized coal now used and the pulverized coke obtained will be burned under boilers. Byproducts will be motor spirit, tar and gas.

Gas Research at Johns Hopkins Has Economic Importance

Dr. Wilbert J. Huff, professor in gas engineering at Johns Hopkins University, has been studying various effects of carbon disulphide as a corrosive agent in gas mains, and has found it possible to carbonize coal, even with high sulphur content, in such manner that carbon disulphide can be produced, or not, at will.

These studies have disproved the generally accepted theory that carbon disulphide was produced by a secondary reaction between hydrogen sulphide and red hot coke. Moreover, they furnish an explanation for the variation of carbon disulphide production such as were noted by Hutton and Thomas at Johns Hopkins University in 1920, when carbonizing high sulphur coal in an experimental 400 pound retort, and when a new light was given to the past researches of Powell and Wibaut.

A full and detailed report on this will be submitted and read by Dr. Huff at Atlantic City, Oct. 12 to 16.

Changes Proposed in Regulations for Shipping Chemicals

Extensive and important changes are proposed in the regulations for transportation of explosives, chemicals and other articles which may involve danger when moved by freight or express. The Interstate Commerce Commission has called a hearing to consider the amended specifications on September 29, at ten o'clock in the I. C. C. building, Washington. On the preceding day representatives of the Bureau of Explosives of the American Railway Association, which has drafted the modified specifications for the Commission, will meet with any persons interested at the Interstate Commerce Building to discuss and if possible agree upon the amendments proposed.

Joint Meeting of Chemical and Rubber Sections of N.S.C.

Joint meetings of the chemical and rubber sections of the National Safety Council will be features of the fourteenth annual Safety Congress which opens at Cleveland, Ohio, Sept. 28, and closes Oct. 2. A. L. Watson, personnel director of the Hooker Electrochemical Co. at Niagara Falls, is chairman of the Chemical Section; I. D. McNaul, Dupont Fibersilk Co., secretary; E. L. Hewitt, manager of the Providence Safety Council, is chairman of the Rubber Section.

News in Brief

New York Paint Club Meeting Postponed—The September meeting of the Paint, Oil & Varnish Club of New York which originally had been called for Sept. 10, has been postponed and will be held at the Biltmore Hotel on Sept. 17.

French Potash Production Larger—According to a report from Paris from trade commissioner D. J. Reagan, the production of potash salts in Alsace amounted to 542,000 metric tons compared with 527,000 metric tons and 480,000 metric tons during the corresponding periods of 1924 and 1923. In terms of K 20, the production of this period of 1925 was the equivalent of 145,000 metric tons or an increase of 7.4 per cent and 22 per cent over the output for the periods in the two preceding years.

Evening Chemistry Course at Cleveland—The Cleveland College, Cleveland, O., affiliated with the Western Reserve University and the Case School of Applied Science, has arranged for a series of evening courses in all branches of chemistry, beginning on Sept. 30. The classes will be held in the Morley chemical laboratory at the university. There will be under-graduate and graduate courses, the latter especially for chemists, engineers and others desiring to supplement their work with advanced instruction.

Large Gain in German Potash Sales—During the first 6 months of this year potash sold by the German industries amounted to 730,000 tons, which is almost three times the amount disposed of during the same period of the preceding year and also represents a vast increase over the total of 520,000 tons of the pre-war record year 1913.

New Alcohol Plant for Norfolk—Reports from Norfolk, Va., state that the Old Dominion Distillers Corporation has been chartered under Virginia laws with a paid in capital of $1,500,000. The new corporation, on Sept. 3, purchased a large tract of waterfront property at Norfolk on which an industrial alcohol plant will be built. The first unit of the plant will be completed by the end of the year and will have a daily capacity of 25,000 gal. of alcohol. Auxiliary plants will be established for the reclamation of carbon dioxide, sulphate of potash, and other by-products.

International Trade Exhibition at New Orleans—With official participation by a half dozen Latin-American governments and private displays by commercial associations and corporations of many other nations, as well as displays by numerous American firms, the International Trade Exhibition opened at New Orleans on Sept. 15. Foreign exhibits are entered free from tariff duty by special act of Congress.

Aluminum Cement Plant in French Indo-China—The growth of the ciment fondu industry in France has offered the means of French interests founding a plant in French Indo-China where large road and dock enterprises are actually under way. La Societe Indo Chinoise du Ciment Fondu will soon open its first plant for the product of aluminous cement under the Lafarge patents. The plant is situated near Haiphong, with adequate supplies of high silica bauxite available. Annual production will be 12,000 to 15,000 tons per annum, with provision for facilities of enlargement as may be required.

Fuel Gas From Lignite—Gas engineers are watching with considerable interest the experiment of a small gas company in Sheridan, Wyoming, which is using the local lignite deposits, which are mined adjacent to the city, for the manufacture of coal gas supplied to the residents and industries of Sheridan for heating and cooking purposes. This is believed to be the first time that lignite has ever been used successfully in coal gas manufacture to the entire exclusion of other materials.

Coal-Tars Lead in Research Expenditures.—In the Tariff Commission report on the dye industry, it is stated that over $2,000,000 was expended for research in coal-tar products in 1924. When the total value of the finished coal-tar products sold in the same year, $56,000,000 is considered, it is probable that expenditures for investigation in this industry have been greater than in any other industrial field. The total research costs reported have exceeded $25,000,000 for the period 1917 to 1924.

Chilean Government Plans to Increase Nitrate Sales

The Chilean government is participating as never before in the propaganda work throughout the world looking to increased use of nitrate of soda. All consular appointees are being given a special course dealing with the uses and properties of nitrate and the most effective arguments to offer the possible customers. They also are acquainted with publicity methods and other means for conducting propaganda. Serious consideration is being given a proposal that consuls be empowered to make actual sales of nitrates.

The Section of Lands, Forests and Fisheries of the Chilean Department of Agriculture is undertaking a study of nitrate costs. Comparative costs of other fertilizer materials also will be compiled. Incidentally the sale of nitrate lands in Chile has been postponed until Dec. 1.

Strawboard Manufacturers Will Support Research

The manufacturers of strawboard in the states of Indiana, Illinois, Iowa and Kansas have decided to establish in Quincy, Ill., the Paper Mill Laboratories, Inc., of which Sidney D. Wells is director. Technical research is the primary purpose of the organization, but development of improved methods of mill control will be an important function. As the members supporting the Laboratory have no manufacturing connections, research will be independent of that carried on in individual company laboratories.

Census Figures Show Decline in Dye Production in 1924

The Tariff Commission will soon issue its eighth annual "Census of Dyes and Other Synthetic Organic Chemicals for 1924." Advance reports give total production of coal-tar dyes by 78 firms in 1924 as 68,679,000 lb., a 27 per cent decline from the output in 1923 of 93,667,524 lb. This reduction is principally due to the decreased activity in the domestic textile industry. Dyes of domestic manufacture now supply about 95 per cent of our consumption, and there was an exportable surplus of certain dyes amounting to 16,000,000 lb. Sales in 1924 totaled 64,961,433 lb., valued at $35,012,400.

Notable progress was made in the manufacture for the first time in this country of many valuable dyes of high fastness. More than 60 dyes were manufactured in 1924 which were not produced in the previous year. These products show that the industry made marked progress during the year in producing many complex types, including dyes of high fastness for cotton, wool, and silk.

Average Price Lower

The average price of all dyes sold in 1924, 54 cents per lb., was a 2 per cent decline from that of the previous year. The average selling price in 1920 was $1.08 per lb., and in 1917, $1.26 per lb.

The 1924 output of dyes, grouped by classes according to the method of application was as follows: Acid dyes, 9,187,256 lb.; basic dyes, 3,676,999 lb.; direct dyes, 14,662,577 lb.; lake and spirit soluble dyes, 967,550 lb.; mordant and chrome dyes, 2,953,987 lb.; sulphur dyes, 14,561,257 lb.; vat dyes, including indigo, 21,818,022 lb.; indigo, 19,996,703 lb.; other vat dyes, 1,821,319 lb.; unclassified and special dyes, 851,354 lb.

The total output of color lakes in 1924 was 9,343,147 lb., as compared with 13,079,115 lb. in 1923. Sales of color lakes amounted to 9,281,673 lb., valued at $4,045,799.

The 1924 production of coal-tar chemicals used as photographic developers totaled 316,183 lb., as compared with 343,289 lb. in 1923. Sales amounted to 312,865 lb., valued at $461,379.

The combined output of synthetic phenolic resins and synthetic tanning materials in 1924 was 12,778,115 lb., as compared with 9,763,685 lb. in 1923. The total sales of the two products in 1924 amounted to 12,745,458 lb., valued at $8,818,041, as compared with 10,068,431 lb. in 1923 with a total valuation of $5,816,590.

The production in 1924 of synthetic organic chemicals other than those derived from coal tar was 115,817,865 lb. and the sales were 85,933,461 lb. valued at $20,604,717. The developments in the non-coal-tar organic chemical industry, particularly in the past few years, have been rapid and this field promises to rival the coal-tar chemical branch in the near future. The production in 1924 was over five times that of 1921. Among the non-coal-tar chemicals showing the largest production during 1924 are the solvents, which include the esters, such as ethyl acetate, butyl acetate, and amyl acetate,

News from Washington

By Paul Wooton

WASHINGTON CORRESPONDENT OF *Chem. & Met.*

CURTAILMENT of the helium program is not expected to result from the Shenandoah disaster. Helium specialists feel that this accident is new proof of the essentiality of that gas.

Advices reaching Washington are to the effect that witnesses agree a flash occurred at the moment the ship went to pieces. This is thought to have been a discharge of static electricity. Had the gas bags been filled with a flammable gas an explosion would have been inevitable and the loss of life greater, it is argued, is was the case in the similar accident in Great Britain.

With the exception of the Los Angeles the Shenandoah was the strongest dirigible ever built. The design was based on that of the German L49 which fell into the hands of the French during the war. There was a general strengthening of the whole frame, however, by our naval engineers who designed the Shenandoah so that it was much stronger than any Zeppelin. The German ships have been able to withstand such storms as they have encountered. While little is known of the forces developed in the upper air by storms it is believed that the disturbances created by thunder storms in the Middle West are more violent than those over the ocean or over Europe.

As a result of this accident it is predicted in naval quarters that stronger ships will be built and that their use will be over the ocean rather than land. In designing the next ship particular attention will be paid to the supports of the cabins so there will be no doubt as to their ability to withstand at any angle the strain to which they may be subjected.

British Dyestuffs Corporation

Advices that the government in Great Britain probably would turn back into the treasury of the British Dyestuffs Corporation for cancellation its holdings of the concern's stock, which amount to 1,700,000 shares, is regarded at the Department of Commerce as being of particular significance. The cable, in full, which comes from Trade Commissioner W. W. Mitchell, says:

"With reference to recently published reports concerning the contemplated sale of the 1,700,000 shares in the British Dyestuffs Corporation held by the British government, the best opinions in the trade hold that there is no possibility of their sale to foreign interests but that the most likely procedure is the return of the government shares to the Corporation, followed by a thorough reorganization with the continuance of government appointees as directors.

"The British Dyestuffs Corporation is overcapitalized and paying no dividends and it is said that the government is interested both in the success of the largest corporation engaged in this key industry and in securing a return to the stockholders whom it encouraged to invest. The placing of the shares upon the market would further depreciate their value and it is consequently believed that the transfer will take the form of a gift, in return for which the government will continue to exercise a voice in the control of the corporation. No action is probable before the convening of Parliament in November."

If the British givernment takes the expected action it will be further proof of the importance it attaches to a domestic dye industry. There is keen realization there that the dye industry is the keystone of the whole organic chemical structure.

There is no fear that the strengthening of the British Dyestuffs Corporation will hurt the American industry. On the contrary the American dye producers will profit, it is believed, as anything which will tend to maintain a powerful and stable opposition to the German cartel will help the American industry.

German Potash Developments

A common interest agreement has been signed by the Wintershall companies and the Kali-Industrie interests in Germany. The agreement, which will expire December 31, 1953, provides for the closing of high cost mines and concentrating production in the low cost properties. Such properties are to be modernized thoroughly. The companies that are parties to the agreement are entitled to furnish forty per cent of the total potash sales.

One of the factors contributing to the recent boom in potash shares in Germany is said to have been the probability of increased prices.

The French are expected to take the lead in the price advance. The way is being paved, it is thought, by dwelling upon the losses which the French producers allege they sustained in building up a market for their salts. The potash producers in both Germany and France are said to be confident that the potash ratio in American fertilizer is about to be increased. This also has had a bearing on the demand for Kali Syndicate stock.

Methanol Production to Increase

Apparently no material objection is to be raised against the proposed increase in the methanol duty under the flexible provisions of the tariff. The general impression is that the President will allow the 50 per cent increase which the law allows. There are many who think this course will do no good, as they believe German costs are so much below ours that the foreign product could pay the increased duty and still have a handsome margin left. They can see no harm in such action by the Tariff Commission, as the only persons who will lose are the importers who will have to surrender a portion of their profit. Consumers will suffer no hardship. It is fully expected that domestic production of synthetic methanol will have begun before any additional tariff legislation can be obtained.

Reports reaching Washington from Germany are to the effect that the Badische's production of methanol this year will reach 15,000 tons. Its 1926 production promises to be 25,000 tons, it is said. Present production is coming from the Mercersburg plant but other units are to be opened at Oppau and at Ludwigshafen.

The great bulk of the German production is going into dyes, resins, and other products which because of the cheaper methanol have an advantage in foreign markets over the American product.

Predictions when the tariff bill was under discussion in Congress to the effect that the high rates simply would build up at home a great volume of competition for American manufacturers, by causing foreign producers to establish branches here, have not been realized. One of the comparatively few plants which have been established here since the passage of the tariff act is the one at Niagara Falls for the synthetic manufacture of acetic acid.

Alcohol Regulations

Decentralization of Prohibition enforcement will not make it necessary to rewrite regulation 61—that pertaining to industrial alcohol. This regulation recently was revised and the change in the form of organization was provided for. It will be necessary, however, to rewrite regulation 60, which is the one pertaining to beverage alcohol.

Such difficulties confront the Tariff Commission in establishing foreign costs in the production of magnesite that none will be surprised if the finding in the magnesite case is delayed indefinitely. In the meantime the domestic industry has great difficulty in meeting the competition of the foreign product in the territory east of Chicago.

There is increasing evidence of lack of prosperity among domestic producers. They had been encouraged greatly by the precedent established in the gold leaf case which apparently paved the way for the inclusion of transportation charges as a part of cost in the magnesite investigation as well. Since they are not in a position to establish the exact costs of their foreign competitors, and since the commission itself seems to be able to make no headway, it is feared that no ruling may be forthcoming.

Potash Permits Cover Large Areas of Public Lands

Potash permits covering more than a million acres of public land have been issued since the enactment of the mineral leasing act. In the same period only seventeen leases have been issued, but the aggregate investment required by them exceeds $2,000,000.

British Chemical Industry Expected To Improve Toward End of Year

Settlement of Labor Difficulties and Improvement in Basic Industries Form Basis for Optimistic Opinions

From Our London Correspondent

THE BUSINESS community is about to settle down again after the holidays, during which there has been little of interest apart from conventions and the influx of visitors on business, pleasure and to see Wembley. The British Empire Exhibition has done far better than was anticipated, but there is no prospect of its being continued as an exhibition, though a portion of it might conceivably be reserved for such purposes in connection with one or other of the various schemes which have been proposed for its future.

The settlement of the coal crisis remains a somewhat unpleasant memory and there is little consolation in knowing that similar trouble has arisen or may arise in other countries. At the end of the nine months' "truce," international agreement may to some extent have to take the place of individual settlement and although many observers in this country share the view held in the United States and elsewhere that Mr. Baldwin's settlement was in the nature of a climb down, it is too early to judge of the merits or to appreciate whether firmer action would have been preferable. Neither in this country nor elsewhere are all the facts yet known and apart from the fact that the miners had a fairly good case, because the owners to some extent concealed profits from by-products, many collieries who have spent their past profits wisely, are sound and able to continue profitably at existing wage rates.

The situation is complicated not only by strike conditions in America and Europe, but by the international crisis in the iron and steel trade and the depression in these industries in other parts of the world is likely to be accentuated in the near future. In Germany, the steel trade is badly hit and coke is practically unsaleable except in respect of present commitments. Some of the coke oven plants are under contract to supply gas for industrial use and town lighting and every ton of coal carbonized represents a loss. Even if sold ultimately, there will still be a loss because such a situation was never anticipated and handling appliances to and from a dump are usually absent. It is therefore not impossible that towards the end of this year these basic industries and also the British chemical industry will revive appreciably and at the end of the "interregnum" it may be possible on the basis of more healthy public opinion and the results of the coal inquiry to eliminate the revolutionary elements — already in process of exposure—and to avoid that further "surrender" to socialism which is feared but not really expected.

South Africa has always proved a center of attraction to investors and as a country with a chemical future. Today the platinum boom in the Transvaal is a center of controversy and in as much as the chemical industry, particularly during the war, required a certain amount of platinum, chemistry is receiving something of an advertisement, fortunately without undue exaggeration. Actually, if production on a largely increased scale is to materialize, it would not be wise to estimate upon a selling basis of more than about $40 per ounce and before the Transvaal's output can attain a figure which would result in such reduction, several years of development would appear to be necessary. The matter is not without interest to the chemical industry, but the consensus of opinion is that the boom has been somewhat overdone and that interest will soon be on the wane.

The Chilean nitrate producers are certainly sitting up and taking notice of the increased synthetic production and in many directions appear to be putting their house in order. Following upon the appointment of chemical engineers to their new industrial research station, good results are expected from the work of the new fuel research station, to which a director was recently appointed, and which may formulate proposals for the satisfactory utilization of indigenous coal supplies. Rumor is again rife in regard to the capital reorganization of the British Dyestuffs Corporation and this time, it takes the form of a proposed renunciation by the government of one-half of their share interest to be carried out in a way similar to that adopted in the case of the British Celanese Co. There is no question, however, but that the government intends to retain the power of veto and its representation on the board, in view of the national importance of a healthy dye industry.

The satisfactory lining of tanks for acid liquors and particularly those containing hot or cold hydrochloric acid, is always of interest and it is exceptional for this to be satisfactorily carried out in situ. Recently, considerable progress has been made with "cabtyrit," a rubber composition with inert filler, which is supplied in sheets and easily applied and jointed while being warmed. The material can also be applied to pipes and appears to form a good joint with the vessel to which it is applied.

Gas From Heavy Fuel Oil

J. E. Hackford has reported upon the production of a permanent gas from heavy fuel oil by partial combustion, the process being under development by Hakol Limited. The crux of the matter really is whether it pays to get gas from oil rather than whether it is possible. According to Mr. Hackford's figures, the cost of the gas is about one-third of that of city gas and two-thirds that of producer gas with coal at $5.50 per ton. A plant capable of making 50,000 cu.ft. of gas per hour was 36 in. long by 18 in. internal diameter, while the subsidiary apparatus would go into a space of 16 sq.ft. The gas obtained may vary between 150 and 250 B.t.u. per cubic foot with a percentage of unsaturated compounds of about 4 to 7.

There is little of interest to report in the methanol situation other than the publication of the latest patents of the Badische Anilin & Sodafabrik, in one of which it is claimed that the carbon monoxide may be replaced in whole or in part by carbon dioxide. This seems a revolutionary statement to make, but if true, would be of considerable importance. Patart in France is stated to be negotiating for commercial exploitation, but in France it takes a lot of noise to produce any visible phenomenon.

Reverting again to the coal industry, there is a distinct tendency towards improved cleaning of coal, which entails efficient dewatering of fines. The Woodall Duckham Co. are introducing for this purpose, the Carpenter centrifuge, invented by the superintendent of the Colorado Fuel and Iron Co. and one of these machines has now been in successful operation for some months.

Germany Will Double Synthetic Methanol Production

Trade Commissioner W. T. Daugherty has issued a review of the German chemical industry. Discussing synthetic methanol, he says that while the production by Germany has been under way since the middle of 1923, knowledge of the fact had not been particularly disturbing to the American wood distillation industry prior to the importation this year of German synthetic methanol. German official foreign-trade figures for the first five months of 1925 show exports of pure methanol amounting to 3,410 metric tons, of which 578 tons went to the United States, 746 tons to Great Britain, 490 tons to Russia, and 469 tons to Switzerland.

Production of synthetic methanol at the Leunawerke is increasing. It is reported, without confirmation, that present production amounts to 1,000 metric tons monthly and that it will be doubled by fall. The dye cartel will probably consume 5,000 to 10,000 tons in connection with its operations.

Another synthetic process which has aroused interest in certain quarters of the American chemical industry is being operated by the Badische in the production of butyl alcohol. As far as can be learned, this is based upon the reduction of aldehydes to alcohols by the use of a suitable catalyst. The chemists Stwimmig and Ulrich apply this process also to the aliphatic oxy-aldehydes and unsaturated aldehydes.

Seeks Court Action to Obtain Alcohol Supply

Suit was filed in the Federal Court at Philadelphia, last Wednesday, by Abraham Salikoff, manufacturer of toilet preparations. Early in the month the Revenue Department had issued an order prohibiting the withdrawal of alcohol by Salikoff on the ground that he had abused his permit. Hearing on the suit was postponed.

Franco-German Trade Negotiations Are Again Under Way

Favorable Results Are Regarded as Improbable—Progress Made Since the War by French Dyeing and Tanning Industries

From Our Paris Correspondent

THE Franco-German negotiations have again been suspended and not even a *modus vivendi* has been reached. It is a year since they started and in spite of concessions by the French it is unlikely that more favorable results will be achieved when negotiations are resumed on Sept. 15.

One fact that should be remembered is that, since Jan. 10, when the five-year truce of the conventions laid down by the Versailles treaty came to an end, the trade between France and Germany has not decreased as much as one might have predicted. Whereas, during the first five months of 1924, France exported to Germany merchandise valued at 1,800 million francs, statistics for 1925 still reach 1,600 millions. However, a notable increase in raw material is to be noted in the exports while there was a decrease of the finished products in these same exports. Therein is a lurking danger since every French industry is especially interested in turning out finished products because the country is comparatively poor in raw material, with the exception of iron ores and bauxite.

The greatest difficulties in reaching an agreement came chiefly from the wine industry, which particularly interests the South of France, and from the textile industry, which is one of the most important branches of French industry. The question of textiles cannot be separated from that of chemical products. In fact these industries consume large amounts of acids, alkalis, chlorine, bisulphites, bichromate, and dyestuffs.

Dyeing and Tanning Extracts

One flourishing industry in France, which likewise lends itself to exportation, even to Germany, is that producing dyeing and tanning extracts. About fifty years ago a few extract plants were to be found in the neighborhood of Paris: Coez & Langlois, Huillard, Meissonnier, etc., but today manufacture is concentrated at Le Havre by a company with a capital of 25 million francs, called the Compagnie Francaise des Extraits Tannants et Tinctoriaux. Still another plant of minor importance is to be found at Marguette-lez-Lille and a third at Lyons belonging to the above company, which really has the monopoly of that trade.

The plants prepare extracts of logwood and old fustic which are the two more important extracts, but they also produce extracts of brazil-wood, young fustic and quercitronbark. A few statistics enable one to gage the importance of this industry: It treats annually approximately 25,000 tons of logwood, 5,000 tons of old fustic, 45,000 tons of quebracho coming from Argentina, totaling about 75,000 to 80,000 tons of wood which yields about 11,000 tons of dyeing extracts (not including quebracho). Of this 4,000 tons of logwood extract and 2,400 tons of different extracts, red and yellow, are exported, about 1,200 tons of which go to Germany.

Before the war the world's consumption of natural dyestuffs (indigo excepted) was calculated to be approximately 40 to 50 million gold francs, out of which European industry consumed 27 million of which 15 million were for France alone. During the war this industry was very prosperous on account of the lack of coal-tar dye, but now it begins to feel the keen competition of all synthetical dyestuffs. Nevertheless certain products, such as logwood, cannot be substituted satisfactorily in the dyeing industry.

To manufacture tanning extracts, France must import certain raw materials which she does not possess: galls from China and the Orient, divi-divi, sumachs, myrobolans. These extracts are made only to a very limited extent. A plant for making tannic acid has been set up at Mulhouse (Alsace) since the armistice; before the war tannic acid as well as gallic acid (import: 6.6 tons) came from abroad.

A truly national industry is the manufacture of chestnut-extract which is done in about thirty plants, actually turning out from 450,000 to 500,000 tons of chestnut-wood annually in France as well as in Corsica. It is reported that a new plant will be set up in Corsica by the Société Alsacienne de Produits Chimiques.

The manufacture of this extract is comparatively simple: the chopped wood is treated systematically in extracting apparatus. The extracts are then concentrated, through a multiple-effect evaporator to the degree required after having been decolorized by ox-blood. The liquid extracts are concentrated to 25 deg. Bé or evaporated to dryness for solid extracts.

Before the war the industry annually produced nearly 40 million gold francs of chestnut extract and exported about 100,000 tons. The surplus was consumed in France and particularly in the silk industry where this extract is utilized for weighting black-dyed silk.

A minor industry, but one in which France takes a leading part, is the manufacture of dyestuffs for alimentary products such as the chlorophyll extracted from vegetables or plants and anthocyanins extracted from flowers. A plant which is specialized in this industry is that of the Société des Matières Colorantes et Produits Chimiques of St. Clair-du-Rhône which is affiliated to the Kuhlmann concern. These plants also prepare the dyestuffs required for bacteriological purposes, all of which before the war came from Germany.

France has always been one of the leading countries in treating skins, hides and furs and for certain special products such as varnished leathers. French chemists have been able to introduce ingenious processes allowing strict control of the boiling of the oils used in the latter process. France moreover possesses an excellent school of tanning at Lyons under the directorship of Professor Meunier.

Synthetic Tanning Materials

The making of so-called synthetic tanning materials has been assured. Their use tends to increase although tanners are still cautious in their application. The product called "diatan" turned out by the Peufaillit firm at St. Gratien is particularly recommended. The advantage of these products is a quick tanning, giving a light color to the leather so that the use of these tanning materials, tends to develop more and more in combination with vegetable tanning or chromium tanning. Indeed oil tanning and alum tanning are declining in this country.

In the pre-war period all leather-dyes came from Germany. Among them were the phosphins of Casella and the rhéonins of the Badische Anilin-and Sodafabrik, for which substitutes have not yet been found. The tanneries use many French colors but these dyestuffs are regarded unfavorably because they are too greatly diluted with sodium sulphate. For this and other reasons the tanners continue to use German dyestuffs. Colors for fur dyeing also formerly came from Germany. The best known were the so-called "Ursol" and "Nako" made by A.G.F.A. At present dyes for fur are turned out in France by the Société des Matières Colorantes de St. Denis under the name of "Fouramines," by the Kuhlmann concern under that of Fursol and by the Société Alsacienne de Produits Chimiques under the name of "Vulpin." These products, are of satisfactory quality and compete successfully with the German products.

Survey Shows Large Consumption of Crude Rubber

The results of a survey of crude rubber consumption in this country during the first seven months of this year, were made known last week by the Department of Commerce. The survey showed that approximately 233,875 long tons of crude rubber were used in this country from the beginning of the year through July. Reports were made by 457 American factories which use more than 99 per cent of all crude rubber consumed. The department believes that the actual total has not been in excess of 235,000 long tons.

The statistics show monthly consumption of crude rubber by American factories as follows: January, 31,282.4 tons; February, 30,194.6; March, 33,549.8; April, 34,041.5; May, 34,707.7; June, 35,162; July, 34,937. Of the total 221,499 tons were of plantation rubber.

The department has no comparable figures showing the monthly consumption of American factories for other years. Other statistics however, show that world production of crude rubber in 1924 reached 414,207 tons, of which about 325,000 tons were used in the United States. The value of the crude rubber consumed in the United States in 1923 was $185,000,000.

Men You Should Know About

J. L. E. CHEETHAM, formerly manager of the Newark, N. J., plant of E. I. duPont deNemours and Co., has been spending the summer in Europe. Upon his return he will assume the managership of the new plant of L'Azote, Inc., a duPont subsidiary, at Charleston, W. Va.

ERNEST W. JOHNSON of Worcester, Mass., has accepted a position as research chemist for the Anglo-Chilean Nitrate Corp., in Chile, and has left for that country.

G. W. KNIGHT, heretofore chief engineer for the Atlas Steel Corp., Fredonia, N. Y., has resigned to become general manager for the Pennsylvania Salt Co., at Natrona, Pa.

Dr. CARL Z. DRAVES, formerly an instructor in chemistry at the University of Washington, Seattle, Wash., has joined the staff of the technical laboratory of E. I. duPont deNemours and Co., Wilmington, Del.

D. H. RUPP, city chemist of East Liverpool, Ohio, was the principal speaker at a recent meeting of the local Kiwanis Club, dealing with the subject "The Water We Drink."

A. N. CHASE has become superintendent at the plant of the Atlas Powder Co., Landing, N. J., succeeding Jesse Turner, who has acted in this capacity for about 4 years.

CLARENCE MILLS, chemist for the Utah-Idaho Sugar Co., at Elsinore, Utah, has resigned.

L. T. SHERWOOD has resigned from the dye works staff of E. I. duPont deNemours and Co., Deepwater Point, N. J., to take a position as glass technologist with the Pennsylvania Wire Glass Co. He will have charge of research and development work at their plant at Dunbar, Pa.

H. H. HAEBERLE, JR., of Atlantic City, N. J., has been appointed assistant chief of the paper division of the United States Department of Commerce, succeeding O. M. Butler, who has left for the Philippine Islands to act as trade commissioner.

E. HUMBOLDT, sugar expert, has returned to his home at Long Beach, Cal., following an extended absence. He has been engaged in superintending the installation of a distillery at the plant of the Central Boston Sugar Co., in Cuba.

DR. A. O. BRADLEY has accepted a position as research chemist at the Jackson Laboratory of E. I. duPont deNemours and Co. He was formerly with the Cincinnati Chemical Works, Cincinnati, Ohio, and more recently he completed his graduate work at Ohio State University.

DR. GEORGE CALINGAERT, divisional director of the Research Laboratory of Applied Chemistry, Massachusetts Institute of Technology, has returned recently from a trip abroad.

DAVID J. PRICE, engineer in charge of development work in the Bureau of Chemistry, U. S. Department of Agriculture, has resigned to take up commercial work with the Mine Safety Appliance Co. of Pittsburgh, Pa., which is engaged in the manufacture of appliances for the prevention of explosions in mines and manufacturing plants. During the past eleven years Mr. Price has carried on important investigations on the causes of dust explosions and means of prevention and control. In this period a number of industries, notably flour milling, have greatly reduced the risks of losses from this cause. During last year Mr. Price was on leave of absence attending Pennsylvania State College. There he received a degree in mining engineering and also secured a number of scholastic honors.

David J. Price

A. C. LANSING has been transferred from process supervising work to chemist at the Peoria, Ill., plant of the Commercial Solvents Corp.

W. J. U. WOOLCOCK has been reelected president of the (British) Society of Chemical Industry.

DR. W. A. RUDISILL of Greenville, Pa., has been appointed chief chemist of the Thatcher Mfg. Co., Elmira Heights, N. Y., manufacturer of milk bottles.

HOWARD A. HORNER has been appointed chief chemist and metallurgist for Frick Co., Waynesboro, Pa., manufacturers of ice and refrigerating machinery. Mr. Horner is a graduate of the Missouri School of Mines and Metallurgy. Since graduation he has served as chemist for the Phelps Dodge Corp., Morenci, Ariz., chemist for the American Smelting & Refining Co., Omaha, Neb., research metallurgist for the Midvale Co., and for the past five years has been in the engineering department of Frick Co.

G. W. KNIGHT, chief engineer for the Atlas Steel Co., Dunkirk, N. Y., has resigned and will become general manager for the Pennsylvania Salt Co., Natrona, Pa.

B. F. DODGE has resigned from the Fixed Nitrogen Research Laboratory staff to accept a position in the Department of Chemical Engineering, Yale University. Mr. Dodge is leaving Washington for New Haven about the first of October.

R. M. EVANS has resigned from the Fixed Nitrogen Research Laboratory staff to join the research group of the duPont subsidiary L'Azote, Inc. He took up his duties at Wilmington on Sept. 1.

WILLIAM P. WARD of the Farmers and Planters Fertilizer Co., of Salisbury, Md., has been added to the District Committee of the National Fertilizer Association of which Gustavus Ober, Jr., is chairman. In like manner Franklin M. Thomas, president of the Central Chemical Co. of Hagerstown, has been added to the committee, so that western Maryland as well as the eastern shore may be better represented.

A. C. WHITTIER has resigned from the dye works staff of E. I. duPont deNemours and Co. to become manager of the new plant of the American Vulcanized Fibre Co. at Kennett Square, Pa.

ESKEL NORDELL, formerly technical director and head of the chemical laboratory of the Wayne Tank and Pump Co., is to have charge of the water softener department of the company.

J. V. N. DORR, president of The Dorr Co., arrived on the "Olympic" August 26, after spending 2½ months in Europe in connection with European business of the company.

KENNETH S. VALENTINE, for five years chief chemist of the Southern Dyestuffs Co., Nitro, W. Va., has severed his connection with that organization, and is now located in New York, where he will engage in consulting work and in the development of several patents.

DR. JOSEPH A. AMBLER, who has been with the Bureau of Chemistry for eight and one-half years, and in charge of the color laboratory at Arlington farm since 1922, has resigned. His work in the Bureau included the investigation of dyes, dye intermediates, biological stains and food colors. During the war Dr. Ambler did some very important research work, as a result of which the Bureau of Chemistry was able to supply the country with photosensitizing dyes until domestic manufacturers were prepared to supply them. Dr. Ambler expects to enter business in Florida.

RONALD G. MACDONALD has resigned his position as chemical engineer with the Oxford Paper Company to join the business department of *Chem. & Met.* Mr. Macdonald is a graduate of Massachusetts Institute of Technology.

Obituary

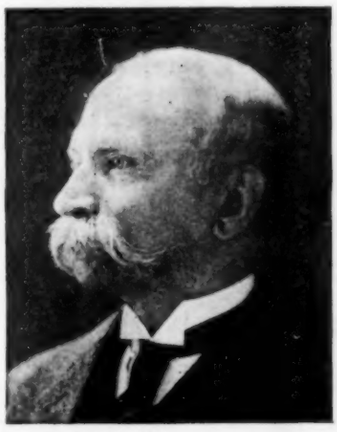
Charles Frederick Chandler

The death of Charles F. Chandler at Hartford, Conn., on Aug. 25, 1925, may be said to have marked a personal loss to every American chemist for there was scarcely a single activity of the profession that had not been entered into during the long experience of this venerable worker. For more than man's proverbial span of "three score years and ten," Professor Chandler was an active leader in chemistry. His honored title, the beloved dean of American industrial chemists, has never been disputed, for his services to such early industries as sugar, textiles and petroleum were the first to demonstrate industry's dependence upon chemistry.

As a teacher, first at Union College and then for forty-seven years at Columbia, Professor Chandler had the gratifying experience of molding chemical education in this country. As a public servant in the Health Department in New York City, he introduced many vital reforms in sanitation and the control of the purity of foods and milk and water supplies. As a builder of chemical organizations Professor Chandler did much to strengthen the profession. He was most active among the founders of the American Chemical Society, the first American to head the Society of Chemical Industry, a founder and the first president of the Chemists' Club of New York. Likewise as an author and editor Professor Chandler pioneered in breaking the ground for the publications that serve the American chemist of today. With it all there was a great human side of the Chandler character that made him beloved by his associates and gave inspiration and confidence to all who had contact with him.

It is scarcely necessary to review here the bare biographical facts of Chandler's life, for these were adequately presented by Whitaker and Bogert at the time of the award of the Perkin medal in 1920 (see *Chem. & Met.*, Vol. 22, No. 4, pages 150-161). At the time of his death he was in his 89th year, having been born Dec. 6, 1836, in Lancaster, Mass. He was educated at the Lawrence Scientific School of Harvard, later attending the Universities of Berlin, and Göttingen. From the latter, in 1856, he received the degree of M.S. As a laboratory assistant and then as professor of chemistry he remained at Union College from 1857 to 1864. In the latter year, with Egleston and Vinton, he organized the Columbia School of Mines, and was its first professor of geology, analytical and applied chemistry. He was subsequently made dean of the school and served for 33 years in that capacity. Resigning the deanship in 1897 he continued as professor of chemistry until his honorable retirement from academic service July 1, 1911. Until within a few months of his death, however, he was actively associated with chemical enterprise, study and research.

It was Professor Chandler's privilege to live to see chemical industry in reality as his remarkable vision had pictured it many years before. The Chemical Museum at Columbia University created by Professor Chandler to impress upon the layman modern civilization's dependence upon chemistry, stands today as a visible reminder of industry's debt to this great chemist.



Charles F. Chandler

ALBERT E. RISING of New York, a consulting engineer, died at his home in Kew Gardens, L. I., Aug. 11. He was formerly an executive of the General Chemical Co. and the Allied Chemical & Dye Corporation.

WALTER J. RICH, chemist and president of the Climax Refining Co., Cleveland, Ohio, died at his home in that city Sept. 2, following a long illness, at the age of 56.

Industrial Notes

THE PATTERSON FOUNDRY AND MACHINE CO., East Liverpool, Ohio, announces through its president, Richard L. Cawood, the following changes in the sales organization of the company: John S. Scott, who has been sales manager in the middle district becomes secretary of the company. C. H. Armstrong, who has been eastern sales manager with headquarters at New York, becomes general sales manager with headquarters at the main office at East Liverpool, Ohio. J. B. Harvey, who has been in the machinery business in New York under the name of The J. B. Harvey Co., has dissolved that company and becomes eastern sales manager at New York, taking Mr. Armstrong's place. Joseph H. Boyd, who has been superintendent of the lower works at East Liverpool for the past twenty years becomes general superintendent with entire charge over manufacturing and with supervision of all plants.

THE INDUSTRIAL SEPARATORS CO. of New York City and the General Engineering Co. of Salt Lake City and New York, are offering improved filtration service as they have affiliated and will work co-operatively on various filtration problems. They are prepared to render engineering service from each office and maintain test laboratories at both cities. The General Engineering Co. which has long been engaged in engineering work pertaining to the mining industry, has more recently become an important factor in the filtration field by its development of the patented Genter thickener. This machine operates on the filtration principle. The Industrial Separators Co. was organized a few years ago to exploit all types of filtration equipment. One of its special filters is the rotary pressure filter which has received considerable attention during the past two years.

THE CHIPMAN CHEMICAL ENGINEERING CO., INC., manufacturers of agricultural insecticides, arsenical products and weed killer, announces the removal of its executive and sales office to its factory buildings at Bound Brook, N. J. A branch office will be maintained at 136 Liberty Street, New York City.

THE LINDE AIR PRODUCTS CO., New York, manufacturer and distributor of oxygen for welding and cutting, announces that its district sales office at Seattle is now located at 421 Railway Exchange Building, 619 Second Avenue, Seattle, Washington. O. H. Davenport is district sales manager.

THE INDUSTRIAL CHEMICAL CO., 200 Fifth Ave., New York, gave a farewell dinner to Isaac Buenaflor, September 8, as he sailed September 11 for the Philippine Islands, where he expects to be for seven or eight months on a business and pleasure trip.

HAYNES STELLITE CO., manufacturers of Stellite metal cutting tools and other articles of high speed, rust and corrosion resisting alloys, has just completed concentration of the company's activities at its plant at Kokomo, Ind. All service in connection with the company's products will hereafter be extended direct from the plant. Headquarters for administration, sales and engineering activities will be in Kokomo, under the direction of C. G. Chisholm, general manager.

Calendar

AMERICAN ELECTROCHEMICAL SOCIETY, Chattanooga, Tenn., Sept. 24, 25 and 26.

AMERICAN GAS ASSOCIATION. Annual convention and exposition, Atlantic City, Oct. 12 to 16, inc.

AMERICAN WELDING SOCIETY. Fall meeting, Boston, Oct. 21, 22 and 23.

ASSOCIATION OF CHEMICAL EQUIPMENT MANUFACTURERS (Chemical Equipment Association). Annual meeting, Hotel McAlpin, N. Y. 2:30 p.m., Sept. 30.

CONGRESS OF INDUSTRIAL CHEMISTRY (Fifth) Paris, France, Sept. 27.

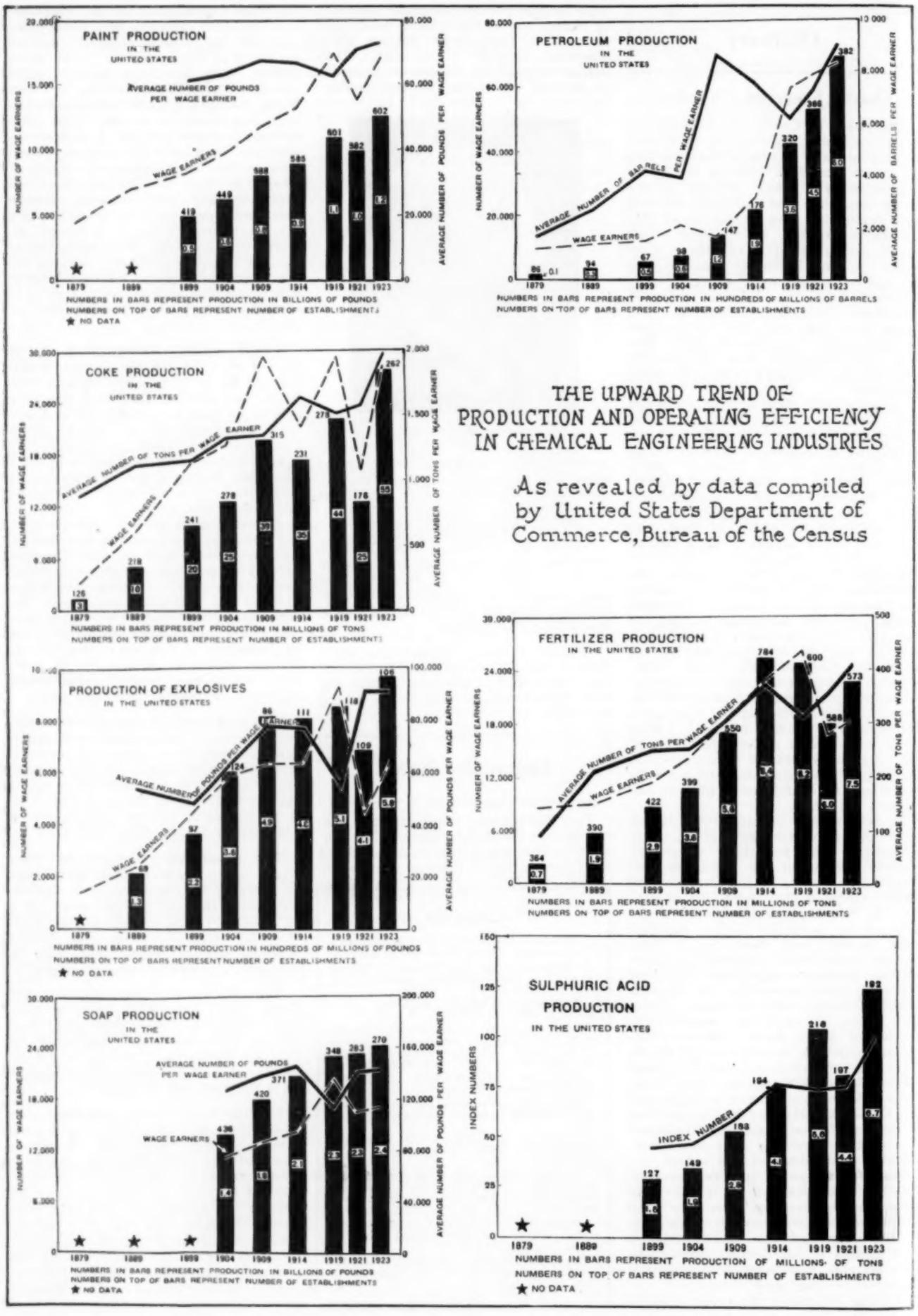
INSTITUTE OF AMERICAN MEAT PACKERS. Annual meeting, Chicago, Oct. 16 to 21.

NATIONAL EXPOSITION OF CHEMICAL INDUSTRIES, New York, Sept. 28 to Oct. 3.

NATIONAL EXPOSITION OF POWER AND MECHANICAL ENGINEERING (Fourth), Grand Central Palace, N. Y., Nov. 30 to Dec. 5.

NATIONAL INDUSTRIAL ADVERTISING ASSOCIATION. Hotel Chalfonte, Atlantic City, Oct. 19, 20 and 21.

NATIONAL SAFETY COUNCIL. Annual meeting, Cleveland, Ohio, Sept. 28 to Oct. 2.


PAINT PRODUCTION
IN THE
UNITED STATES
AVERAGE NUMBER OF POUNDS
PER WAGE EARNER
WAGE EARNERS
NUMBER OF WAGE EARNERS
AVERAGE NUMBER OF POUNDS PER WAGE EARNER
1879 1889 1899 1904 1909 1914 1919 1921 1923
419 449 588 583 601 382 602
NUMBERS IN BARS REPRESENT PRODUCTION IN BILLIONS OF POUNDS
NUMBERS ON TOP OF BARS REPRESENT NUMBER OF ESTABLISHMENTS
★ NO DATA
PETROLEUM PRODUCTION
IN THE
UNITED STATES
AVERAGE NUMBER OF BARRELS PER WAGE EARNER
WAGE EARNERS
NUMBER OF WAGE EARNERS
AVERAGE NUMBER OF BARRELS PER WAGE EARNER
1879 1889 1899 1904 1909 1914 1919 1921 1923
86 0.1 94 67 98 147 178 320 366 382
NUMBERS IN BARS REPRESENT PRODUCTION IN HUNDREDS OF MILLIONS OF BARRELS
NUMBERS ON TOP OF BARS REPRESENT NUMBER OF ESTABLISHMENTS
COKE PRODUCTION
IN THE
UNITED STATES
AVERAGE NUMBER OF TONS PER WAGE EARNER
WAGE EARNERS
NUMBER OF WAGE EARNERS
AVERAGE NUMBER OF TONS PER WAGE EARNER
1879 1889 1899 1904 1909 1914 1919 1921 1923
126 218 241 278 315 231 276 176 262
NUMBERS IN BARS REPRESENT PRODUCTION IN MILLIONS OF TONS
NUMBERS ON TOP OF BARS REPRESENT NUMBER OF ESTABLISHMENTS
THE UPWARD TREND OF
PRODUCTION AND OPERATING EFFICIENCY
IN CHEMICAL ENGINEERING INDUSTRIES
As revealed by data compiled
by United States Department of
Commerce, Bureau of the Census
FERTILIZER PRODUCTION
IN THE UNITED STATES
AVERAGE NUMBER OF TONS PER WAGE EARNER
WAGE EARNERS
NUMBER OF WAGE EARNERS
AVERAGE NUMBER OF TONS PER WAGE EARNER
1879 1889 1899 1904 1909 1914 1919 1921 1923
364 390 422 399 550 784 600 588 573
NUMBERS IN BARS REPRESENT PRODUCTION IN MILLIONS OF TONS
NUMBERS ON TOP OF BARS REPRESENT NUMBER OF ESTABLISHMENTS
PRODUCTION OF EXPLOSIVES
IN THE UNITED STATES
AVERAGE NUMBER OF POUNDS PER WAGE EARNER
WAGE EARNERS
NUMBER OF WAGE EARNERS
AVERAGE NUMBER OF POUNDS PER WAGE EARNER
1879 1889 1899 1904 1909 1914 1919 1921 1923
69 97 124 86 111 109 106
NUMBERS IN BARS REPRESENT PRODUCTION IN HUNDREDS OF MILLIONS OF POUNDS
NUMBERS ON TOP OF BARS REPRESENT NUMBER OF ESTABLISHMENTS
★ NO DATA
SOAP PRODUCTION
IN THE
UNITED STATES
AVERAGE NUMBER OF POUNDS
PER WAGE EARNER
WAGE EARNERS
NUMBER OF WAGE EARNERS
AVERAGE NUMBER OF POUNDS PER WAGE EARNER
1879 1889 1899 1904 1909 1914 1919 1921 1923
436 420 371 348 283 270
NUMBERS IN BARS REPRESENT PRODUCTION IN BILLIONS OF POUNDS
NUMBERS ON TOP OF BARS REPRESENT NUMBER OF ESTABLISHMENTS
★ NO DATA
SULPHURIC ACID
PRODUCTION
IN THE UNITED STATES
INDEX NUMBER
INDEX NUMBERS
1879 1889 1899 1904 1909 1914 1919 1921 1923
127 149 188 194 218 197 192
NUMBERS IN BARS REPRESENT PRODUCTION OF MILLIONS OF TONS
NUMBERS ON TOP OF BARS REPRESENT NUMBER OF ESTABLISHMENTS
★ NO DATA

Market Conditions and Price Trends

Favorable Outlook for Chemicals During Fall Months

Reserve Stocks Are Not Large and Consuming Outlets Give Promise of Enlargement—Prices on Firm Basis

WITH the fairly even distribution of chemicals which existed throughout the summer months, surplus stocks in the hands of producers are reported to be relatively light and the industry is in a position to take advantage of whatever industrial expansion may follow. That consuming industries will take on larger quantities of raw materials in the near future is attested by reports from textile centers that many plants which had been closed, were reopened on Sept. 8 and that others which had been working part-time had gone on a full-time basis. Encouraging reports also have come from the leather trade with larger outputs in prospect for paper and glass. Building permits are holding on a high level and a large demand is forecast for chemical pigments and colors.

Activities in prominent consuming industries offer a basis for the belief that actual consumption of chemicals in July was above seasonal standards. Assuming that the increase in production was in proportion to the larger number of workers employed, a direct method of comparison is offered by the index figures for employment reported to the Bureau of Labor. These figures show gains in employment in July over June for all the industries under consideration with the exception of the leather and glass trades. The increases are still more favorable if the comparison is confined to July of last year. The most pronounced increase over July, 1924, is found in the rubber tire trade. This is in line with recent reports that the industry has been operating at a record pace during the past three months. The extent to which consuming demand has grown is further shown by the statement that rubber companies in the Akron district will have expended by the end of the year, approximately $4,000,000 for factory buildings and additions, either completed or started during the present year. The index numbers for employment show the following:

INDEX OF EMPLOYMENT

	July 1925	June 1925	July 1924
Dyeing and finishing textiles	96	95.6	86.8
Leather	86.5	87.6	81.1
Paper and pulp	94.2	93.3	91.2
Chemicals	90.4	90.3	84.9
Fertilizers	67.6	62.3	57.4
Glass	91.1	92.0	83.2
Automobile tires	119.0	117.7	90.0
Petroleum refining	96.3	93.7	93.7

Chemical Prices Firmer

Declines in prices for chemicals have been infrequent during the past month. The general firmness throughout the list and higher sales schedules for some important selections, notably denatured alcohol and the lead pigments, point out that the trend of values is upward. With raw materials in a firm position and fuel advancing in price, there is but little hope for any reductions in production costs which might be passed along to the finished products. Increased demand also is expected and price factors in general, point to a steady, if not an advancing, level of values for chemical products. The weighted index number now stands at 112.84 as compared with 111.67 for last month and 110.94 for last year.

Lower Index Number for Oils

A large carryover of old crop cottonseed oil combined with reports of a large seed supply for the new year, brought about a decline in both the crude and refined cottonseed oil markets during the month, largely under this influence the weighted index number for vegetable oils and fats declined from 158.37 in August to 156.04. A year ago the weighted number was 142.68. Linseed oil closed at the same level as a month ago but sold at lower figures during the period. An early movement of new crop flaxseed undoubtedly would result in lower prices but the crop is not yet made and much will depend on weather conditions between now and the time of harvest.

Export Trade Expands

Returns, as compiled by the Department of Commerce, reveal material expansion in the July movement of chemicals and allied products to foreign countries as compared with July, 1924. Exports of these products increased from an aggregate value of $8,461,487 in July, 1924, to $10,307,448 in the corresponding period of 1925, indicating favorable progress in foreign sales of American chemical products.

The advances in value of exports which were made in pigments, paints and varnishes, 61 per cent; medicinal and pharmaceutical products, 31 per cent; fertilizers and fertilizer materials, 52 per cent; essential oils, 57 per cent; naval stores, 1 per cent; perfumery and perfume material, 10 per cent; and sulphur slightly more than 100 per cent; were offset by the declines in industrial chemicals, 2 per cent; coal-tar chemicals, 16 per cent; explosives, 6 per cent; and vegetable dye extracts, 30 per cent.

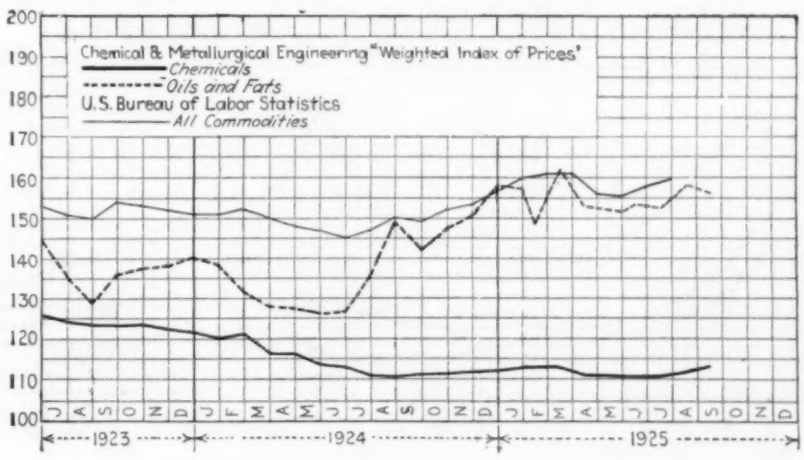
Decline in Coal-Tars

Of coal-tar chemicals 16 per cent less was exported in July, compared with the same month of 1924, or $745,503 and $894,390 respectively. The leading items in the coal-tar exports which decreased during the periods under discussion were benzol, which diminished from $235,064 to $88,317 and dyes which decreased 10 per cent to $488,416 during July, 1925.

The 52 per cent gain in fertilizers and fertilizer materials exported was due chiefly to increased sales of sulphate of ammonia, which rose in value from $528,908 to $1,086,735. Land pebble also registered an increase, but a falling off took place in the remaining items of the group.

Imports Advance 40 Per Cent

Imports of chemical and allied products rose in value from $6,815,596 in July, 1924, to $9,505,193 for the corresponding month of 1925, an increase of approximately 40 per cent. More than one-half of the total imports consisted of necessary crude materials, such as fertilizers and fertilizer materials, which accounted for 53 per cent of the total imports, gums, resins, and balsams, 26 per cent and china wood oil 11 per cent. Of the smaller group decreases were reported for medicinal preparations, paints, paint materials and perfumery.



Market Conditions and Price Trends

Facts and Figures of Business

in Chemical Engineering Industries

Industrial Statistics Presented Graphically for Those Who Follow the Monthly Trends of Production and Consumption

MANUFACTURING production in July showed a slight improvement over June at 129 per cent of the 1919 average, according to the index number of the Department of Commerce, and was 28 per cent higher than in July, 1924. All groups except iron and steel, lumber, leather and paper and printing improved from the previous month, while compared with a year ago all groups increased their output except foodstuffs.

The output of raw materials was slightly lower than a year ago, the marketings of animal products and crops being less than in July, 1924, while the production of minerals and forestry products increased.

The index of unfilled orders of iron, steel and building materials remained the same as in June, but was 16 per cent higher than a year ago, both the iron and steel and building material groups being higher on July 31 than a year ago.

Stocks of commodities held on July 31 declined almost 10 per cent from June and were also lower than on July 31, 1924, when allowance is made for seasonal tendencies. All classes of stocks participated in the decline from June.

Compared with a year ago, the raw foodstuffs groups had larger stocks on hand, while manufactured commodities showed a decline and the raw materials for manufacture remained unchanged.

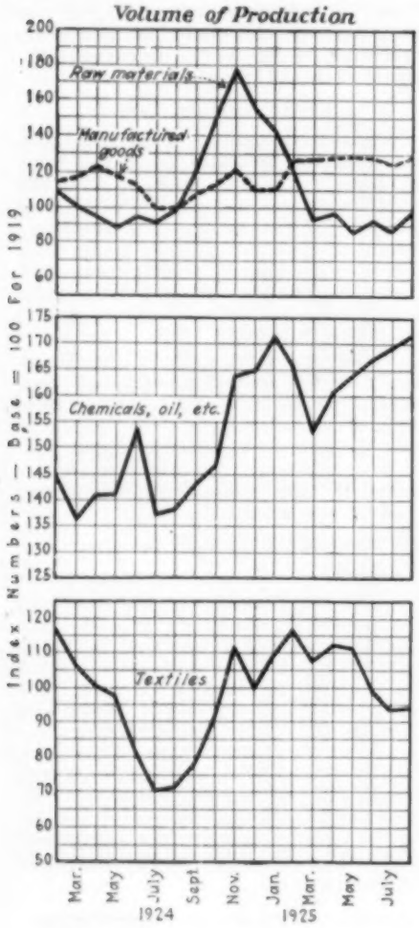
A further rise in the general level of wholesale prices is shown for July by information gathered in representative markets by the U. S. Department of Labor through the Bureau of Labor Statistics. The Bureau's weighted index number, which includes 404 commodities or price series, rose from 157.4 in June to 159.9 in July, a gain of 1.6 per cent, and the highest level reached since Feb. 1921.

Farm products including grains followed an irregular course and the same was true of foodstuffs. In the remaining groups prices showed little variation from those of the previous month, the tendency being upward for cloths and clothing, metals, and chemicals and drugs, and downward for fuels, building materials, and housefurnishing goods.

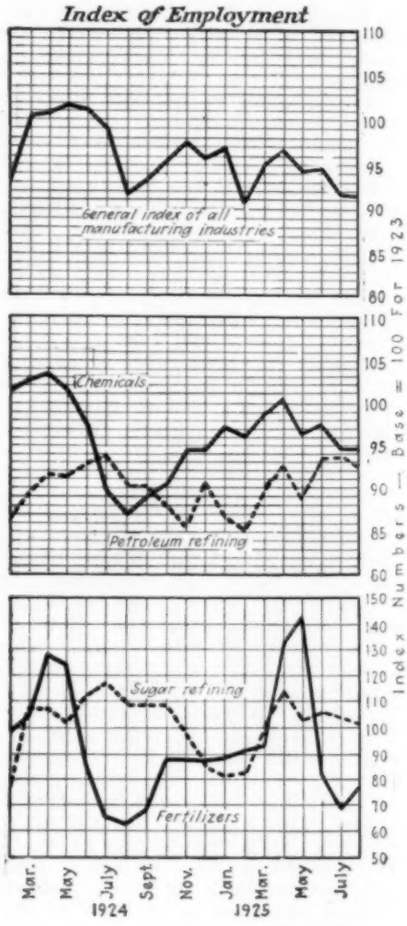
Of the 404 commodities or price series for which comparable information for June and July was collected, increases were shown in 132 instances and decreases in 97 instances. In 175 instances no change was reported.

Comparing prices in July with those of a year ago, it is seen that the general level increased 8¾ per cent.

Volume of Production

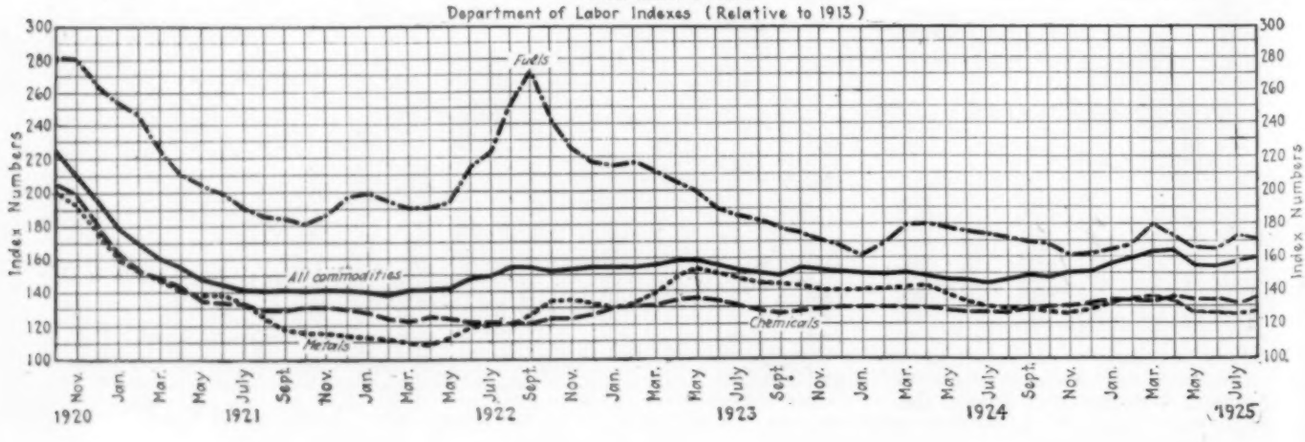


Index of Employment



Wholesale Prices

Department of Labor Indexes (Relative to 1913)



Market Conditions and Price Trends

Close of Calcium Arsenate Season Finds Large Surplus Stocks

Larger Distribution in August Failed to Prevent Heavy Carryover—Price Concessions Figure in Export Trade in Bleaching Powder

WITH the closing of the calcium arsenate season on Aug. 31, interest in trade circles centered in the statistical position of this chemical. Different estimates are heard regarding production and consumption in the past "cotton" year and different views also are given relative to the amount of arsenate carried into the new season. It is conceded that surplus stocks are large, so large in fact that they would be able to take care of consuming requirements of the coming season without the aid of new production. Consumers in the cotton states bought more freely in August than they had earlier in the year but weather and other conditions were none too favorable for weevil growth and the arsenate season again proved unprofitable to manufacturers. During August arsenate was offered freely in southern states at 7c. per lb., but reports credit sales as low as 5½c. per lb. Total consumption of arsenate during the season is estimated at 16,000,000 lb.

A marked falling off in imports of German synthetic methanol is shown in the official returns for July. The total imported in that month was 7,847 gal. While previous attempts to secure antidumping orders against imported methanol did not succeed, it is stated that government authorities are investigating production costs and sales prices which may be used to invoke an antidumping order as well as to form a basis for an increase in the existing duty. Incidentally reports from abroad state that the output of German methanol will be doubled before the end of year.

New Mode of Quoting Linseed Oil

An unusual development has arisen in the market for linseed oil. From the establishment of the industry, sales prices have been quoted on a gallon basis. One of the largest crushers has notified the trade that, beginning Oct. 1, quotations would be made on a pound basis. It is expected that other crushers will follow suit and that the latter method of quoting will become general.

The Crop Reporting Bureau on Sept. 9, issued a report on the growing flaxseed crop. Condition as of Sept. 1 was given at 69.7, yield per acre at 7.4 bu., and total indicated yield, 22,953,000 bu. This estimate shows a decline, in total yield, from the previous report of about 500,000 bu. This is in conformity with reports of unfavorable conditions in the flax-growing states and tends to destroy hopes of low priced linseed oil during the coming year.

There is some interest in new contract prices for chemicals which are expected to be issued in the near future. Buyers believe there is a possibility of lower contract prices for caustic soda and soda ash but generally it is held that former levels will be maintained. Bichromates are of interest also with the probability that competition will develop in the case of contract placements of some of the largest consumers.

Export Trade and Prices for Bleaching Powder

According to official compilations exports of bleaching powder for the 7 months ended July, amounted to 18,779,172 lb. as compared with 13,197,385 lb. in corresponding period of last year. This represents an increase of about 41.5 per cent for the period and makes it evident that export trade has been a factor in absorbing surplus stocks of domestic producers. Exports by months, showing amounts and average invoice prices, were as follows:

	Lb.	Average Price Per Lb.
Jan.	2,560,748	1.74c.
Feb.	1,264,724	1.79c.
March	2,084,545	1.79c.
April	2,462,471	1.83c.
May	3,309,843	1.65c.
June	4,029,699	1.35c.
July	3,067,142	1.52c.

It will be noted that shipments were largest in June and that the average price per lb. for that month was lower than in any of the other months enumerated. In all cases the average prices were lower than the open market quotation for home delivery. If the usual custom of quoting for export on a f.a.s. basis was followed, the invoice prices as given above would be subject to reductions in order to find the price at works as freight rates to the seaboard would be on account of sellers. The significance in a comparison of prices for home and export appears to rest in the deduction that sellers have attempted to sustain buying confidence at home and either have met competition in foreign markets or have been willing to cut prices for export in order to prevent accumulations at producing points.

In considering shipments to different countries it is found that prices were well maintained on exports to South America but that European countries were given the benefit of prices considerably below the average level. Exports in June included 3,523,415 lb. for Canada. This was valued at $44,365 or an average of slightly less than 1.26c. per lb. Shipments to Finland were reported at 224,165 lb., with a valuation of $2,555, equivalent to less than 1.14c. per lb. The latter average price also applied to exports to Norway, the amount being 111,940 lb. and the value $1,276. This quotation of approximately 1.14c. per lb. seemed quite general to countries of Northern Europe as in the export returns for May, shipments to Norway, Sweden, and Latvia were at that average price.

Official figures show July exports and imports of chemicals as follows:

Exports of Chemicals

	July, 1925	July, 1924
Benzol, lb.	2,719,375	7,449,755
Aniline oil and salts, lb.	14,321	4,981
Acid, acetic, lb.	42,074	62,443
Acid, boric, lb.	21,096	29,759
Acid, sulphuric, lb.	354,548	640,967
Methanol, gal.	28,447	50,462
Aluminum sulphate, lb.	4,071,428	2,154,773
Acetate of lime, lb.	2,457,159	3,195,825
Calcium carbide, lb.	233,093	1,365,984
Bleaching powder, lb.	3,067,142	1,664,109
Copper sulphate, lb.	214,863	65,191
Formaldehyde, lb.	65,731	47,432
Potassium bichromate, lb.	20,779	87,269
Sodium bichromate, lb.	713,209	.....
Sodium, cyanide, lb.	45,701	86,741
Borax, lb.	2,585,594	1,805,259
Soda ash, lb.	3,760,227	2,143,970
Sodium silicate, lb.	3,737,531	2,708,239
Sal soda, lb.	2,356,267	1,032,603
Caustic soda, lb.	9,139,626	8,715,062
Sulphate of ammonia, ton	20,183	9,081

Imports of Chemicals

	July, 1925	July, 1924
Dead or creosote oil, gal.	6,735,919	4,576,587
Naphthalene, lb.	58,650	127,047
Pyridine, lb.	44,928	14,306
Arsenic, lb.	1,751,486	1,537,902
Acid, citric, lb.	29,120	33,600
Acid, formic, lb.	67,199	71,363
Acid, oxalic, lb.	90,798	169,158
Acid, sulphuric, lb.	1,712,990	931,500
Acid, tartaric, lb.	96,320	267,038
Ammonia, chloride, lb.	433,298	526,616
Ammonia, nitrate, lb.	1,179,486	546,218
Barium compounds, lb.	1,112,849	1,438,232
Calcium carbide, lb.	499,575	710,857
Copper sulphate, lb.	225,476	161,200
Bleaching powder, lb.	12,220	80,862
Potassium cyanide, lb.	198,937	7,412
Potassium carbonate, lb.	529,877	594,773
Potassium hydroxide, lb.	1,020,148	756,934
Potassium chlorate, lb.	1,813,546	678,635
Sodium cyanide, lb.	2,963,497	1,206,278
Sodium ferrocyanide, lb.	61,488	346,182
Sodium nitrite, lb.	.....	26,358
Sodium nitrate, ton.	68,791	50,901
Sulphate of ammonia, ton.	75	46

Chem. & Met. Weighted Index of Chemical Prices

Base = 100 for 1913-14

This month	**112.84**
Last month	111.67
September, 1924	110.94
September, 1923	123.28

A generally firm tone throughout the chemical list combined with advances in price for denatured alcohol, basic carbonate of lead, sulphate of ammonia and nitrate of soda, brought about a rise in the weighted index number.

Chem. & Met. Weighted Index of Prices for Oils and Fats

Base = 100 for 1913-14

This month	**156.04**
Last month	158.37
September, 1924	142.68
September, 1923	135.77

The decline in the weighted index number during the month was largely due to lower sales prices for cottonseed oil. Corn, castor, and menhaden oils also were lower. Linseed oil recovered from earlier declines and closed firm and unchanged for the period.

Current Prices in the New York Market

For Chemicals, Oils and Allied Products

The following prices refer to round lots in the New York market. Where it is the trade custom to sell f.o.b. producing points, the quotations are given on that basis and are so designated. Prices for the corresponding period last month and last year are included for comparative purposes. Prices are corrected to September 14.

Industrial Chemicals

		Current Price	Last Month	Last Year
Acetone, drums	lb.	$0.12 -$0.13	$0.12 -$0.13	$0.16 -$0.16½
Acid, acetic, 28%, bbl.	cwt.	3.00 - 3.25	3.00 - 3.25	3.12 - 3.37
Boric, bbl	lb.	.08½- .10	.08½- .10	.09 - .09½
Citric, kegs	lb.	.45½- .47	.45½- .47	.45½- .47
Lactic, 44%, tech., light, bbl.	lb.	.13½- .14	.13½- .14	.12½- .13
22% tech., light, bbl.	lb.	.06½- .07	.06½- .07	.06 - .06½
Muriatic, 18° tanks	cwt.	.80 - .85	.80 - .85	.80 - .85
Nitric, 36°, carboys	cwt.	.04½- .04½	.04½- .04½	.04 - .04½
Oxalic, crystals, bbl.	lb.	.10½- .11	.10½- .11	.09½- .10
Sulphuric, 60°, tanks	ton	8.50 - 9.50	8.50 - 9.50	8.00 - 9.00
Tartaric, powd., bbl	lb.	.27½- .30	.27½- .30	.26½- .29
Alcohol, ethyl, 190 p'f. U.S.P. bbl.	gal.	4.90½- 5.00½	4.85 - 4.90	4.81 - 4.91
Alcohol, denatured, 190 proof No. 1 special dr.	gal.	.54½-	.48½-	.53 -
No. 5, 188 proof, dr.	gal.	.53½-	.47½-	.52 -
Alum, ammonia, lump, bbl.	lb.	.03½- .04	.03½- .04	.03½- .04
Potash, lump, bbl.	lb.	.02½- .03½	.02½- .03½	.02½- .03½
Aluminum sulphate, com., bags	cwt.	1.40 - 1.45	1.40 - 1.45	1.35 - 1.40
Aqua ammonia, 26°, drums	lb.	.06 - .06½	.06 - .06½	.06½- .06½
Ammonia, anhydrous, cyl.	lb.	.30 - .32	.30 - .32	.28 - .30
Ammonium carbonate, powd. tech., casks	lb.	.11 - .11½	.12 - .12½	.12½- .12½
Ammonium nitrate, tech., casks	lb.	.08 - .08½	.08 - .08½	.09 - .10
Ammonium sulphate, wks.	cwt.	2.80 - 2.85	2.75 - 2.80	2.70 - 2.75
Amylacetate tech., drums	gal.	2.75 - 3.25	2.75 - 3.25	2.50 - 2.60
Arsenic, white, powd., bbl.	lb.	.03½- .04½	.03½- .04½	.07½- .07½
Arsenic, red, powd., kegs	lb.	.12 - .12½	.12½- .13	.14½- .15½
Barium carbonate, bbl.	ton	48.00 -50.00	48.00 -52.00	57.00 -59.00
Barium chloride, bbl.	ton	57.00 -60.00	58.00 -60.00	73.00 -74.00
Bleaching powder, f.o.b. wks., drums	cwt.	1.90 - 2.00	1.90 - 2.00	1.90 -
Borax, bbl.	lb.	.05 - .05½	.05 - .05½	.05½- .05½
Calcium acetate, bags	cwt.	2.75 - 2.80	2.75 - 2.80	3.00 - 3.05
Calcium arsenate, dr.	lb.	.07 - .08	.06 - .07	.08 - .09
Calcium carbide drums	lb.	.05 - .05½	.05½- .06	.05 - .05½
Calcium chloride, fused, dr. wks.	ton	21.00 -	21.00 -	21.00 -
Carbon bisulphide, drums	lb.	.05 - .06	.05½- .06	.06 - .06½
Carbon tetrachloride drums	lb.	.07 - .07½	.07 - .07½	.06½- .07
Chlorine, liquid, tanks, wks.	lb.	.04 - .04½	.04 - .04½	.04 - .04½
Copperas, bbl., f.o.b. wks.	ton	13.50 -14.00	13.00 -14.00	16.00 -17.00
Copper carbonate, bbl.	lb.	.16½- .17	.16½- .17	.17 - .17½
Copper sulphate, bbl.	cwt.	4.50 - 4.60	4.50 - 4.60	4.50 - 4.85
Cream of tartar, bbl.	lb.	.21½- .22	.21½- .22	.21 - .21½
Epsom salt, dom., tech., bbl.	cwt.	1.65 - 2.00	1.75 - 2.00	1.75 - 2.00
Epsom salt, imp., tech., bags.	cwt.	1.30 - 1.40	1.30 - 1.40	1.35 - 1.40
Ethyl acetate, 85% drums	gal.	.87 - .90	.87 - .90	.92 - .95
Formaldehyde, 40%, bbl.	lb.	.08½- .09	.08½- .09	.08½- .09
Fusel oil, crude, drums	gal.	2.40 - 2.50	2.40 - 2.50	2.00 - 2.25
Glauber's salt, bags	cwt.	1.15 - 1.25	1.15 - 1.25	1.20 - 1.40
Glycerine, c.p., drums, extra	lb.	.19 - .19½	.19 - .19½	.19 - .19½
Lead: White, basic carbonate, dry, casks	lb.	.10½-	.10½-	.10 -
White, basic sulphate, csk	lb.	.10 -	.09½-	.09 -
Lead acetate, white crys., bbl.	lb.	.14½- .15	.14½- .15	.14½- .15
Lead arsenate, powd., bbl.	lb.	.16 - .17	.16 - .17	.16 - .18
Lithopone, bags	lb.	.05½- .06	.06 - .06½	.06½- .06½
Magnesium carb., tech., bags.	lb.	.06½- .07	.06½- .07	.08½- .08½
Methanol, 95%, dr.	gal.	.58 - .62	.58 - .62	.74 - .76
Methanol, 97%, dr.	gal.	.60 - .64	.60 - .64	.76 - .78
Nickel salt, double, bbl.	lb.	.10 - .10½	.10 - .10½	.09 - .10
Nickel salts, single, bbl.	lb.	.10½- .11	.10½- .11	.10 - .11
Phosphorus, red, cases	lb.	.70 - .75	.75 - .80	.70 - .75
Phosphorus, yellow, cases	lb.	.34 - .36	.34 - .36	.37½- .40
Potassium bichromate, casks	lb.	.08½- .08½	.08½- .08½	.08½- .06½
Potassium carbonate, 80-85%, calcined, casks	lb.	.06 - .06½	.05½- .06	.05 - .05½
Potassium chlorate, powd.	lb.	.08½- .09	.08½- .09	.07 - .07½
Potassium hydroxide (caustic potash) drums	lb.	.07½- .07½	.07½- .07½	.06½- .07
Potassium muriate, 80% bgs	ton	34.55 -	34.55 -	34.55 -
Potassium nitrate, bbl.	lb.	.06½- .06½	.06½- .06½	.06 - .07½
Potassium permanganate, drums	lb.	.14½- .15	.14½- .15	.13 - .13½
Potassium prussiate, yellow, casks	lb.	.18½- .18½	.18 - .18½	.17 - .17½
Salammoniac, white, casks	lb.	.06 - .07	.05½- .07	.06½- .07½
Salsoda, bbl.	cwt.	1.10 - 1.30	1.20 - 1.40	1.20 - 1.40
Soda ash, light, 58% bags, contract	cwt.	1.25 -	1.25 -	1.25 -
Soda, caustic, 76%, solid, drums, contract	cwt.	3.10 -	3.10 -	3.10 -
Sodium acetate, works, bbl.	lb.	.04½- .05	.04½- .05	.04½- .05
Sodium bichromate, casks	lb.	.06½- .06½	.06½- .06½	.07½- .07½
Sodium chlorate, kegs	lb.	.06½- .06½	.06½- .06	.06½- .07
Sodium chloride, tech.	ton	12.00 -14.75	12.00 -14.75	12.00 -14.00
Sodium cyanide, cases, dom.	lb.	.18 - .22	.18 - .22	.20 - .22
Sodium fluoride, bbl.	lb.	.08 - .09	.08½- .09	.08½- .09
Sodium nitrate, bags	cwt.	2.50 -	2.47 -	2.50 -
Sodium nitrite, casks	lb.	.08½- .09	.08½- .09	.09 - .09½
Sodium phosphate, dibasic, bbl.	lb.	.03½- .03½	.03½- .03½	.03½- .03½
Sodium prussiate, yel. drums.	lb.	$0.10½-$0.10½	$0.10½-$0.10½	$0.09½- 0.10
Sodium silicate (30°, drums)	cwt.	.75 - 1.15	.75 - 1.15	.75 - 1.15
Sodium sulphide, fused, 60-62% drums	lb.	.03 - .03½	.03 - .03½	.02½- .03
Sodium sulphite, crys., bbl.	lb.	.03 - .03½	.02½- .03	.02½- .03
Sulphur, crude at mine, bulk	ton	15.00 -15.00	15.00 -16.00	14.00 -16.00
Sulphur, flour, bag	cwt.	2.35 - 3.00	2.35 - 3.00	2.25 - 2.35
Tin bichloride, bbl.	lb.	.16 -	.16½-	.14½-
Tin oxide, bbl.	lb.	.60 -	.62 -	.55 -
Tin crystals, bbl.	lb.	.39½-	.40½-	.37 -
Zinc chloride, gran., bbl.	lb.	.07½- .08	.07½- .08	.06 - .07½
Zinc oxide, lead free, bag	lb.	.07½-	.07½-	.07½-
5% lead sulphate, bags	lb.	.07 -	.07 -	.06½-
Zinc sulphate, bbl.	cwt.	3.00 - 3.50	3.00 - 3.50	3.00 - 3.25

Oils and Fats

		Current Price	Last Month	Last Year
Castor oil, No. 3, bbl.	lb.	$0.15½-$0.16	$0.16 -$0.16½	$0.16½-$0.17
Chinawood oil, bbl.	lb.	.13½- .14	.13½- .13½	.15½- .16
Coconut oil, Ceylon, tanks, N. Y.	lb.	.11 -	.10½-	.09½-
Corn oil, crude, tanks, (f.o.b. mill)	lb.	.09½-	.09½-	.12 -
Cottonseed oil, crude (f.o.b. mill), tanks	lb.	.09 -	.10 -	.08½-
Linseed oil, raw, car lots, bbl.	gal.	1.05 -	1.05 -	1.00 -
Palm, Lagos, casks	lb.	.09 -	.09 -	.08½- .08½
Niger, casks	lb.	.08 -	.08½-	.07½-
Peanut oil, crude, tanks (mill)	lb.	.09½-	.10 -	.11½-
Rapeseed oil, refined, bbl.	gal.	1.00 - 1.02	.97 - .98	.86 - .88
Sesame, bbl.	lb.	.15 - .15½	.15 - .15½	.13½- .13½
Soya bean tank (f.o.b. Coast)	lb.	.11½-	.11½-	.10½- .10½
Sulphur (olive foots), bbl.	lb.	.08½-	.08 -	.09½- .09½
Cod, Newfoundland, bbl.	gal.	.62 - .64	.63 - .64	.63 - .65
Menhaden, light pressed, bbl.	gal.	.76 - .78	.78 - .80	.64 -
Crude, tanks (f.o.b. factory)	gal.	.50 -	.52½-	.50 -
Grease, yellow, loose	lb.	.09 - .09¼	.09¼- .09½	.07½-
Oleo stearine	lb.	.13½-	.15 -	.13 -
Red oil, distilled, d.p. bbl.	lb.	.11½- .11½	.11½- .11½	.09½- .09½
Tallow, extra, loose	lb.	.09 -	.09½-	.08½-

Coal-Tar Products

		Current Price	Last Month	Last Year
Aniline oil, drums, extra	lb.	$0.17 -$0.17½	$0.17 -$0.17½	$0.16 -$0.16½
Aniline salts, bbl.	lb.	.20 - .22	.20 - .22	.22 - .23
Anthracene, 80%, drums	lb.	.60 - .65	.60 - .65	.70 - .75
Benzol, 90%, tanks, works	gal.	.24 - .29	.24 - .29	.23 - .28
Beta-naphthol, tech., drums	lb.	.22 - .24	.22 - .24	.24 - .25
Cresylic acid, 97%, drums, works	gal.	.59 - .63	.59 - .62	.63 - .65
Naphthalene, flake, bbl.	lb.	.05 - .05½	.05 - .05½	.04½- .05
Phenol, U.S.P., drums	lb.	.22 - .24	.22 - .24	.24 - .26
Picric acid, bbl.	lb.	.25 - .26	.25 - .26	.20 - .22
Resorcinal, tech., kegs	lb.	1.35 - 1.40	1.35 - 1.40	1.30 - 1.40
Salicylic acid, tech., bbl.	lb.	.33 - .34	.33 - .34	.32 - .33
Solvent naphtha, w.w., tanks	gal.	.26 -	.25 -	.25 -
Toluene, tanks, works	gal.	.26 -	.26 -	.26 -
Xylene, com., tanks	gal.	.26 - .27	.26 - .27	.25 - .27

Miscellaneous

		Current Price	Last Month	Last Year
Barytes, grd., white, bbl.	ton	$20.00-$22.00	$17.00-$17.50	$16.00-$17.0
Casein, tech., bbl.	lb.	.13½- .14	.13 - .13½	.10½- .11
China clay, powd., f.o.b. Ga.	ton	10.00 -20.00	12.00 -15.00	14.00 -20.00
Imported, pwd.	ton	45.00 -50.00	45.00 -50.00	45.00 -50.00
Dry colors: Carbon gas, black (f.o.b. works)	lb.	.07 - .07½	.07 - .07½	.09 - .11
Lamp black, bbl.	lb.	.12 - .40	.12 - .40	.12 - .40
Prussian blue, bbl.	lb.	.34 - .36	.34 - .36	.36 - .38
Ultramarine blue, bbl.	lb.	.08 - .35	.08 - .35	.08 - .35
Sienna, Italian, bbl.	lb.	.04 - .12	.04 - .12	.05 - .12
Umber, Turkey, bbl.	lb.	.04 - .06	.04 - .06	.04 - .05
Chrome green, bbl.	lb.	.28 - .30	.23 - .30	.28 - .30
Carmine red, tins	lb.	4.90 - 4.75	4.50 - 4.75	4.50 - 4.70
Para toner	lb.	.90 - .95	.90 - .95	.95 - 1.00
Vermilion, English, bbl.	lb.	1.35 - 1.50	1.40 - 1.45	1.30 - 1.35
Chrome yellow, C. P., bbl.	lb.	.18 - .18½	.18 - .18½	.17 - .17½
Ocher, French, casks	lb.	.02½- .03½	.02 - .03	.02½- .03
Feldspar, No. 1 (f.o.b. N. C.)	ton	5.50 - 6.00	5.50 - 6.00	6.50 - 7.00
Graphite, Ceylon, lump, bbl.	lb.	.08½- .09	.08 - .09½	.05½- .06
Gum copal, Congo, bags	lb.	.08½- .10	.08½- .10	.09 - .14
East Indian, bags	lb.	.14½- .15	.14 - .15	.16 - .18
Manila, bags	lb.	.14 - .16	.14 - .16	.18 - .19
Damar, Batavia, cases	lb.	.25 - .26	.25 - .26	.23½- .24
Kauri, No. 1 cases	lb.	.57 - .65	.60 - .65	.60 - .65
Kieselguhr (f.o.b. N. Y.)	ton	50.00 -55.00	50.00 -55.00	50.00 -55.00
Magnesite, calc.	ton	40.00 -41.00	35.00 -42.00	35.00 -40.00
Pumice stone, lump, bbl.	lb.	.06 - .08	.04½- .08	.05 - .05½
Imported, casks	lb.	.03 - .40	.03 - .40	.03 - .35
Pyrites, Span., fines, c.i.f.	unit	.13 -	.13 -	.10 - .10½
Domestic, fines (f.o.b. Ga.)	unit	.12 -	.12 -	.10½- .11
Shellac, orange, fine, bags	lb.	.52 - .53	.55 - .57	.63 - .64
Bleached, bonedry, bags	lb.	.59 - .62	.61 - .67	.71 - .72
T. N., bags	lb.	.49 - .51	.53 - .55	.59 - .60
Soapstone (f.o.b. Vt.), bags	ton	9.00 -11.00	7.00 - 7.50	7.50 - 8.00
Talc, 200 mesh (f.o.b. Vt.)	ton	11.00 -	11.00 -	10.00 -
200 mesh (f.o.b. Ga.)	ton	7.50 -10.00	7.50 -10.00	8.00 -12.00
325 mesh (f.o.b. N. Y.)	ton	14.75 -	14.75 -	14.75 -
Wax, Bayberry, bbl.	lb.	.20 - .21	.20 - .22	.21 - .21½
Beeswax, ref., light	lb.	.40 - .42	.45 - .49	.32 - .34
Candellila, bags	lb.	.30 - .31	.30 - .31	.23 - .23½
Carnauba, No. 1, bags	lb.	.37 - .38	.37 - .38	.33 - .35
Paraffine, crude 105-110 m.p.	lb.	.06 - .06½	.06 - .06½	.06½-

Current Industrial Developments

New Construction and Machinery Requirements

Outstanding Opportunities

Asphalt .....Lacon, Ala.
Beet Sugar .....El Paso, Tex.
Chemicals.....Everett, Mass.
Chemicals.....Mexia, Tex.
Confectionery .....Cambridge, Mass.
Cotton Oil .....Lamesa, Tex.
Enamelware.....Chattanooga, Tenn.
Fertilizer.....Little Rock, Ark.
Gas.....Bradenton, Fla.
Gas.....Iron Mountain, Mich.
Glass.....Tarentum, Pa.
Glass.....Wallaceburg, Ont.
Laboratory .....Chicago, Ill.
Laboratory .....Brooklyn, N. Y.
Laboratory .....Cleveland, O.
Lubricating Oils.....Rahway, N. J.
Paper .....Riegelsville, N. J.
Paper .....Three Rivers, Que.
Rubber .....Akron, O.
Rubber .....East Akron, O.
Soap .....Edgewater, N. J.
Sugar .....Savannah, Ga.
Varnish .....Grand Rapids, Mich.

This page is of value not only as a machinery market but also as an index of the general activity and growth of the industries served by Chem. & Met. The reports are gathered by our regular correspondents who are instructed to verify every detail. Requirements for new machinery will be published here free of charge.

New England

Conn., Bridgeport—Remington Typewriter Co., Railroad Ave., has had plans prepared for the construction of a 3 story addition to ribbon and carbon paper manufacturing unit. Estimated cost $50,000. Private plans. Machinery will be required.

Mass., Cambridge (Boston P. O.) — Daggett Chocolate Co., 35 Lewis Wharf, Boston, awarded contract for the construction of a 6 story, 80 x 180 ft. factory at Massachusetts Ave., Main and Ames Sts., to W. H. Bailey & Co., 88 Broad St., Boston. Private plans.

Mass., Cambridge (Boston P. O.)—New England Confectionery Co., 253 Summer St. Ext., Boston, awarded contract for the construction of a 6 story factory at Massachusetts Ave. and Lansdowne St. here to Hegeman-Harris Co., 16 North Havard St., Brighton. Estimated cost $1,000,000.

Mass., Chelsea (Boston P. O.)—Gordon & Gerber, 20 Summer St., manufacturers of rubber goods, plan the construction of a 1 story, 60 x 150 ft. addition to plant. S. S. Eisenber, 46 Cornhill, Boston, is architect. Equipment will be required.

Mass., East Cambridge (Boston P. O.)—Viscol Co., 200 First St., is in the market for a 4 or 6 in. tubing machine for rubber factory.

Mass., Everett (Boston P. O.)—Merrimac Chemical Co., 148 State St., Boston, is having plans prepared for the construction of a 1 and 2 story addition to plant here. Estimated cost $40,000. Private plans.

Mass., Malden (Boston P. O.)—Boston Rubber Shoe Co., 130 Essex St., Boston, awarded contract for the construction of a 3 story plant on Commercial St. here, to Central Engineering & Construction Co., 210 Main St. Pawtucket, R. I. Estimated cost $50,000.

Mass., North Monson (Monson P. O.)—The Rubwood Wheel Corporation, has work under way on the construction of addition to plant for the manufacture of rubber compound for own use.

R. I., Pawtucket—U. S. Finishing Co., 389 Charles St., Providence, awarded contract for the construction of a dye house here, to H. G. Killam, Silver Spring Beach, Providence.

Middle Atlantic

N. J., Edgewater — Palmolive Co., 42 Fourth St., Milwaukee, Wis., will receive bids until September 15th for the construction of a 1 story, 82 x 120 ft. plant for the manufacture of soap, etc., here. Estimated cost $200,000. Lockwood, Greene & Co., 400 North Michigan Blvd., Chicago, Ill., are engineers.

N. J. Newark—Standard Sanitary Mfg. Co., 18 East 45th St., New York, will soon receive bids for the construction of a 4 story warehouse on Ferry St. here. Estimated cost $500,000. W. S. Timmis, 315 5th Ave., New York, is architect and engineer.

N. J. Rahway—The Albany Grease Co., 708 Washington St., New York, N. Y., has had plans prepared for the construction of a 1 and 2 story addition to plant for the manufacture of lubricating oils, etc., here. Estimated cost $50,000.

N. J., Riegelsville — Warren Mfg. Co., awarded contract for the construction of a 3 story, 75 x 140 ft. paper mill and 2 story 60 x 80 ft. warehouse, to H. K. Ferguson Co., 4900 Euclid Ave., Cleveland, O.

N. J., Vineland — Kimball Glass Co., awarded contract for the construction of a 3 story, 90 x 100 ft. factory to W. P. Cameron Engineering Co., Witherspoon Bldg., Philadelphia, Pa. Estimated cost $70,000.

N. Y., Brooklyn—Dept. of Public Welfare, Municipal Bldg., New York, is having plans prepared for the construction of an 8 story laboratory for Kings County Hospital, Winthrop St., here. Estimated cost $475,000. Dodge & Morrison, 160 Pearl St., New York, are architects and engineers.

Pa., Latrobe—Latrobe Electric Steel Co., is receiving bids for the construction of a 1 story, 60 x 400 ft. addition to electric steel plant. Estimated cost $100,000.

Pa., New Brighton — Standard Sanitary Mfg. Co., Bessemer Bldg., Pittsburgh, is having preliminary plans prepared for the construction of a 5 story, 30 x 50 ft. addition to chemical building, here. Estimated cost $50,000. B. H. Prack, Martin Bldg., Pittsburgh, is architect.

Pa., Philadelphia—Certain-Teed Products Corporation, 2nd and Erie Sts., awarded contract for the construction of a group of buildings including a 1 story, 70 x 153 ft. warehouse, 1 story, 20 x 230 ft. cell house, 3 story, 45 x 90 ft. coating building to Stoffiet & Tillotson, Wesley Bldg. Estimated cost $250,000.

Pa., Philadelphia—The Haines, Jones & Cadbury Co., 1136 Ridge Ave., manufacturers of plumbers brass goods, etc., has acquired site at Roosevelt Blvd. and Palethrop St. and plans the construction of a new plant.

Pa., Tarentum—C. L. Flaccus Glass Co., 2nd Ave., awarded contract for the construction of a 1 story, 70 x 120 ft. glass plant to Guthbert Bros., Bessemer Bldg., Pittsburgh.

South

Ala., Spocari—Warrior Cement Corporation, A. C. Deer, Pres., 705 Battle Place, Chattanooga, Tenn., plans to increase the capacity of plant to approximately 2,750 bbl. daily. Contracts for machinery awarded.

Ala., Lacon—The Southern Rock Asphalt Co., c/o T. R. Petway & Co., Nashville, Tenn., have acquired 120 acres land and will develop same and operate an asphalt mine here. Estimated cost including equipment, $250,000.

Fla., Bradenton—City, L. L. Hine, Clk., awarded contract for the construction of a carbureted water and oil and gas plant and distribution system to American Gas Construction Co., Newton, O. $99,500.

Fla., St. Petersburg—City plans an election to vote $254,000 bonds for extension to gas plant.

Ga., Savannah—Savannah Sugar Refining Corporation, awarded contracts for the construction of a 120 x 260 ft. plant. Estimated cost $60,000. B. O. Sprague, is architect.

Miss., Starkville—Borden Condensed Milk Co., 510 North Dearborn St., Chicago, Ill., awarded contract for the construction of a 2 story plant at Montgomery St. and C. I. tracks to D. D. Thomas & Sons, 463 North Dunlop St., Memphis, Tenn. Estimated cost $75,000.

Tenn., Chattanooga — Central Franklin Process Co., awarded contract for the construction of a 2 story dyeing mill to Gallivan Construction Co., Greenville, S. C. Estimated cost $125,000 to $150,000.

Tenn., Chattanooga—Crane Enamelware Co., 1316 Chestnut St., awarded contract for the construction of a group of buildings including a 1 story, 180 x 228 ft. enamelware building, 1 story, 60 x 360 ft. grinding building, foundry, etc., to Monudy & Co., James Bldg. Estimated cost including machinery, $750,000.

Va., Roanoke—The Linde Air Products Co., 30 East 42nd St., New York, N. Y., awarded contract for the construction of a 1 story addition to plant here to J. P. Pettyjohn & Co., 212 8th St., Lynchburg, Va. Estimated cost $25,000.

Middle West

Ill., Chicago—Portland Cement Assn., 111 West Washington St., awarded contract for the construction of a 5 story office and laboratory building at Grand Ave. and Dearborn St. to Turner Construction Co., 242 Madison Ave., New York, N. Y. Estimated cost $300,000.

Mich., Grand Rapids—Grand Rapids Varnish Co., 567 Godfrey St. S. W., is having plans prepared for the construction of a 2 story, 56 x 100 ft. varnish factory. Estimated cost $75,000. H. L. Mead, is architect. Owner is in the market for equipment for the manufacture of varnish.

Mich., Iron Mountain — Iron Mountain Gas Co. awarded contract for the construction of a 2 story, 62 x 80 ft. addition to gas plant to G. Gustafson & Co., Norway. Estimated cost $40,000.

O., Akron—Goodyear Tire & Rubber Co., G. M. Stadelman, East Market St., awarded contract for the construction of a 5 story, 120 x 280 ft. warehouse to Hunkin-Conkey Construction Co., Hunkin-Conkey Bldg., Cleveland. Estimated cost $350,000.

O., Cleveland — W. R. Hopkins, City Manager, City Hall, plans the construction of a laboratory building on Scranton Road. Estimated cost $400,000. H. Kregelius, City Hall, is architect.

O., Cleveland—Mt. Sinai Hospital, F. T. Halle, Chn. of Building Comn., East 105th St. and Ansel Road, awarded contract for the construction of a group of buildings including a 4 story, 34 x 118 ft. laboratory, etc. on East 105th St. to Reaugh Construction Co., 2835 East 51st St. Estimated cost $1,000,000.

O., Cleveland—Vitrolite Co., C. A. Myers, Pres., 2907 Detroit Ave., is receiving bids for the construction of a 2 story, 44 x 147 ft. factory for the manufacture of white tile. Estimated cost $50,000. A. B. Sylvanus & Co., 6014 Euclid Ave., are architects.

O., Coshocton—Beach Enameling Co., will soon receive bids for the construction of a 1 story, 60 x 146 ft. addition to factory. Estimated cost $55,000. Company architects in charge. Owner is in the market for equipment.

O., East Akron—General Tire & Rubber Co., 1708 East Market St., Akron, plans the construction of a 3 story, 60 x 160 ft. addition to factory for the manufacture of rubber tires, tubes, etc., here, to double capacity of plant. Estimated cost $200,000 to $250,000.

Wis., Ashland—Lake Superior Paper Co., R. Meyer, Mgr., awarded contract for remodeling 2 story paper mill to Fluor Bros. Construction Co., 52 Otter, St., Oshkosh, Estimated cost $45,000.

Wis., Pardeeville — Pardeeville Canning Co., awarded contract for the construction of a 1 story, 50 x 160 ft. cannery to J. C. Dreblow, Estimated cost $40,000. Owner is in the market for canning and conveying machinery.

West of Mississippi

Ark., Little Rock — Arkansas Fertilizer Co., 2200 East North Little Rock, will build an additional unit to plant. Estimated cost $20,000. Fertilizer equipment to cost $50,000 will be installed.

Colo., Fort Collins—The Union Oil Co., Santa Monica Blvd., Los Angeles, Calif., has had plans prepared for the construction of a new gasoline refinery including compressor works for extraction here. Estimated cost including equipment $450,000.

Kan., Coffeyville—Sherwin Williams Co., 116th and Stephenson Sts., Chicago, Ill., awarded contract for a roasting kiln for paint and varnish factory to Acme Foundry & Machine Co., Coffeyville. Estimated cost $100,000.

Mo., Kansas City—Seidlity Varnish Co., 18th St. and Garfield Ave., awarded contract for the construction of a 4 story, 60 x 100 ft. addition to varnish factory to W. H. Hall, 414 Hall Bldg. Estimated cost $100,000.

Mo., Poplar Bluff—International Rubber Co., c/o J. H. Dalbey, Poplar Bluff Rubber Co., is having preliminary plans prepared for the construction of a rubber tube factory.

Mo., St. Louis—Mississippi Glass Co., Main and Angelica Sts., awarded contract for the construction of a 1 and 2 story, 95 x 185 ft. glass plant at 95 West Angelica St. Estimated cost $250,000.

Mo., Troy—Clima Specialty Co., awarded contract for the construction of a 1 story, 80 x 100 ft. factory for the manufacture of rubber goods to Trowbridge & Cousins, Hannibal. Estimated cost $20,000.

Tex., Donna—H. Hansen, plans the construction of a plant for canning and packing vegetables and fruit. Estimated cost $40,000. Private plans. Machinery will be required.

Tex., El Paso—A. Y. Smith, Pearce, Ariz., plans the construction of a 2 story beet sugar mill here. Estimated cost $200,000. Private plans.

Tex., Lamesa—M. A. Fuller Cotton Oil Co., Snyder, is having plans prepared for the construction of a 2 story, cotton oil mill for the manufacture of by-products here. Estimated cost $130,000. Private plans.

Tex., Mexia—Western Agriculture Chemical Co. is having preliminary plans prepared for the construction of a 2 story, 60 x 200 ft. plant for the manufacture of chemicals to be extracted from agricultural products. Estimated cost $50,000. Company engineers in charge.

Far West

Calif., Los Angeles — The Los Angeles Paper & Mfg. Co., 1633 North San Pablo St., awarded contract for the construction of a 1 story, 50 x 300 ft. mill on Valley Blvd. to C. P. Harp, Chamber of Commerce Bldg.

Calif., Los Angeles — Sunset Silk Hose Mills, F. B. Norman, Mgr., 403 Grosee Bldg., is receiving bids for the construction of a 2 story, 70 x 135 ft. factory including a 1 story, 33 x 64 ft. dyeing and finishing building at San Fernando Road and Edwards Ave. Estimated cost $80,000. M. H. Merrill & Co., 615 Laughlin Bldg., are engineers.

Calif., Pittsburgh — Johns-Manville Inc., 500 Post St., San Francisco, has purchased a 17 acre site and plans the construction of the first unit of plant here. Total estimated cost $1,000,000. Work to be done by company forces.

Canada

Alta., Calgary—Canadian Pacific Railway Co., awarded contract for the construction of a scrubbing plant to treat the gas from No. 4 well which will be piped here, also awarded contract for the construction of a gas main from Calgary to the Turner Valley oil field to handle the flow from No. 4 Royalite well and other wells. Besides producing more than 600 bbl. of high grade naphtha daily No. 4 well is producing between 15,000,000 and 20,000,000 cu.ft. of gas in the same time. Estimated cost $250,000 and $350,000 respectively.

Ont., Hamilton—City plans the construction of a chlorination and waterworks filtration plant including reservoir, filter and chlorination equipment, etc. Estimated cost $600,000. W. L. McFaul, City Hall, is engineer.

Ont., Leamington — Tobacco Sales Corporation, has had plans prepared for extensions to factory and engine house including the installation of special presses and drying machinery for processing tobacco for European markets, etc. Estimated cost $35,000.

Ont., Ottawa — Dept. of Public Works, S. E. O'Brien, Secy., is in the market for complete laboratory equipment for public building at Winnepeg, Man.

Ont., Wallaceburg—Dominion Glass Co., is having plans prepared for rebuilding and enlarging its flint glass furnaces, constructing additional storage building and making extensive improvements to its producer gas equipment. Estimated cost $100,000. Private plans.

Que., Three Rivers — St. Maurice Paper Co., Montreal, has had plans prepared for the construction of a 4 machine newsprint plant at St. Maurice Shore, here. Estimated cost $6,000,000. G. Ferguson, 504 West 53rd St., New York, N. Y., is engineer.

Unverified

Calif., Avon—Associated Oil Co., refining plant was partially destroyed by fire, loss is estimated at $500,000.

N. Y., Ithaca—Brown Paper Mill Co., plans the construction of a portion of plant to replace fire loss. Estimated cost $40,000. Equipment will be required.

N. Y., Lockport—Lockport Paper Co., Mill and Frost Sts., plans to rebuild portion of the asbestos shingle plant destroyed by fire. Loss is estimated at $100,000, including machinery.

Minn., Duluth—Cutler-Mager Lime Co., 8th Ave., has plans under consideration for rebuilding portion of plant including kilns, etc., to replace fire loss. Estimated cost $100,000.

Okla., Sapulpa — The Tibbens Gasoline Co., is considering the rebuilding of its natural gasoline refinery recently destroyed by fire. Loss is estimated at $100,000 including equipment.

Incorporations

Monarch Soap and Chemical Co., Oakland, Calif., $100,000. E. J. Ridley, 724 Mandana Blvd., A. F. Baker, 5619 Harmon Ave., Oakland.

Treblas Brass Products Co., Inc., East Hartford, Conn., $50,000. 1,000 shares of $50 par value. J. Treblas, W. Treblas, East Hartford, Conn., G. Kabureck, Rocky Hill, Conn.

The Lat Perizer Corporation, Dover, Del., $20,500,000. Manufacture sanitary soaps for shaving purposes. M. A. Bruce, F. R. Bogart, E. C. Lehane, Wilmington, Del. (Corporation Trust Co. of America, Dover, Del.)

Adamant Portland Cement Corporation, $4,000,000. T. T. Blaise, Mason City, Ia. C. J. Lambert, H. S. Boyes, Sigourney, Ia. (American Charter Co., Dover, Del.)

James S. Mason Corporation, Wilmington, Del., $600,000. Manufacture polishing compounds. (American Guaranty and Trust Co., Dover, Del.)

Whittle Rubber Co., Dover, Del., $100,000. L. A. Peck, H. E. White, N. E. Leach Wilmington, Del. (P. L. Garrett, Wilmington, Del.)

California Stucco Products Co., of Philadelphia, Wilmington, Del., manufacture, $100,000. (Corporation Service Co.)

Colorado Texas Refining Co., Wilmington, Del., oil, $100,000. (Corporation Service Co.)

Pulverized Minerals Co., Dover, Del., minerals, $200,000. E. E. Craig, Dover, Del. (United States Corporation Co.)

Dentists' Pyorrhea Association, Dover, Del., manufacture and sale of patent medicines, $5,200,000.

Atlantic Paper Tube Corporation, Dover, Del., manufacture paper, $75,000.

Power Oil Co., Dover, Del., $350,000, coal tar, crude oils, etc.

Bay Petroleum Co., Wilmington, Del., $1,000,000. (Corporation Trust Co. of America)

American Charcoal and Chemical Corporation, Wilmington, Del., $500,000. (Colonial Charter Co.)

Louisiana Portland Cement Co., Wilmington, Del., $10,000,000. (Corporation Trust Co. of America.)

Southern States Mica Co., Dover, Del., $1,200,000. C. M. Cooley, S. N. Goodman, Atlanta, Ga.; F. Shefner, Chamblee, Ga. (Colonial Charter Co.)

Vandome Petroleum Corporation, Wilmington, Del., oil, $1,000,000. (Corporation Service Co.)

Dia Tom Products, Dover, Del., oils, $2,500,000. (United States Corporation Co.)

Puritan Oxygen Co., Somerville, Mass., 1000 shares no par stock, W. Lynch, W. H. O'Connell, Boston, M. L. Hersetm, Cambridge, Mass.

Kitanning Plate Glass Co., Wilmington, Del., $10,500,000. (Corporation Service Co.)

Galer Oil Co., Dover, Del., $250,000, refine market and distribute crude oil and petroleum.

National Gypsum Co., Dover, Del., gypsum, lime, etc., $10,000,000.

Southern Concrete Products Corporation, Miami, Fla., $40,000; limit of indebtedness $500,000. C. W. Hayes, C. Ford, A. Logerstrom.

J. R. Kilburn Glass Co., Inc., Chartley, Mass., glass manufacturer, $50,000. J. R. Kilburn, C. A. Kilburn, W. A. Kilburn, Chartley, Mass.

Dralti Products Co., Inc., Brockton, Mass., rubber cement, blacking and various stains, $10,000. 100 shares, $100 par. W. B. Tibbets, F. E. Drake, G. W. Robbins, 21 Somerset Place, Brockton, Mass.

Spiritol Co., Boston, Mass., chemical oils, $25,000 and 750 shares no par value stock. P. C. Hill, A. H. Coughlin, 4 Pequossett Road, Belmont, Mass.

The Wells Different Ink Co., Lynn, Mass., ink, $25,000. H. R. Hutchinson, F. H. Nichols, R. C. Wells, 11 Nichola St., Lynn, Mass.

Luboil Refining Co., Inc., Kansas City, Mo., R. Radermacher, 3432 Cleveland St., Kansas City, Mo.

Cotter-Goggin, East Bloomfield, Ontario County, lubricants, etc., $25,000. M. Cotter, W. Goggin. (Atty., J. Shea, Canandaigua, N. J.)

Federal Brass Foundry, Belleville, N. J., $100,000 in preferred and 250 shares common, no par. Peter P. Nielsen, W. J. Brown, Belleville, N. J.; G. Stadeler, Newark, N. J. (Atty., J. B. Brown, Newark, N. J.)

Browning Pyroxylin Products Corporation, North Arlington, N. J., manufacturing, $100,000. W. H. Browning, H. E. Browning, Jersey City, N. J.; P. Hoffman, Belleville, N. J. (Attys., Darling, Barnes & Dowden, Jersey City, N. J.)

Realty Paint Co., Patterson, N. J., manufacturing, $50,000. L. H. Smith, E. L. Smith, Rochelle Park, N. J. F. M. Smith, Hasbrouck Heights. (Atty., J. O. Benson, Paterson, N. J.)

Belleville Mfg. Corporation, Belleville, N. J., rubber and chemical goods, 1,250 shares no par. I. Y. Turck, B. Leebel, F. G. Turck, C. W. Leebel, Belleville, N. J. (Atty., J. B. Brown, Newark, N. J.)

Jaenecke Ault Co. of South America, Newark, N. J., manufacturing paints, etc., $150,000. C. H. Ault, Summit, N. J., F. G. Nuetz, Newark, N. J. M. Koans, Irvington, N. J. (Attys., Lintott, Kahrs & Young, Newark, N. J.)

Amboy Duco Co., South Amboy, N. J., paints, oils, etc., $125,000. H. Bolte, C. F. Mikels, F. Norcross, Keyport, N. J. (Atty., J. A. Coan, South Amboy, N. J.)

Crescent Tile Co., Trenton, N. J., $100,000. S. H. O'Donnell, C. H. Darling, A. Reikosky, Trenton, N. J. (Filed by company.)

The Red Bank Paper Co., Inc., Red Bank, N. J., manufacture of paper. $100,000. W. I. Spain, R. P. Reckles, C. L. Reckles, Red Bank, N. J. (Atty., Reilly, Quinn & Parsons, Red Bank, N. J.)

Friars Inc., Camden, N. J., petroleum products, $100,000. C. Friars, Paulsboro, N. J., C. Gegnan, Camden, N. J., J. B. Clark, Merchantville, N. J. (Atty., C. A. Cogan, Camden, N. J.)

Gardner Beardsell & Co., Inc., Nashua, N. H., manufacture leather and leather products, $200,000. E. D. Sargent, Nashua, Pres.

Benjamin Griffen Glass Corporation, New York, N. Y., $500,000. H. F. Williams, M. B. Cullen, M. D. Welch. (Attys., Jerome & Rand, 37 Wall St., New York, N. Y.)

Helpa Products Corporation New York, N. Y., dyes and chemicals, 3,000 common, no par. M. Kemmel, C. E. Rhoades, C. Mortimer, New York, N. Y. (Atty., D. L. Podell, 111 Broadway, New York, N. Y.)

Metropolitan Refining Co., New York, N. Y., $250,000. L. F. and G. Edwards. (C. Weg, 280 Broadway)

Universal Refining Products, New York, N. Y., $100,000. (C. Weg, 280 Broadway)

L. F. Edwards Refining Co., New York, N. Y., $250,000, manufacture lubricants, L. F. and O. Edwards, (S. I. Segall, 220 Bway.)

Capitol Paint and Varnish Works, New York, N. Y., $75,000. J. Goldenberg, W. Hyman, (K. Greenberg 51 Chambers St., Manhattan).

Analox Paint & Color Corporation, New York, $20,000. W. H. McNutt, A. F. A. Konig, F. M. Shaw, New York. (Atty., A. E. Amsler, 9571 113th St., Richmond Hill, N. Y.)

Supreme Paint & Varnish Corporation, Brooklyn, N. Y., 200 common, no par. J. Goldberg, D. H. Brown, W. Hyman, Brooklyn, N. Y. (Atty., K. Greenberg, 51 Chambers St., New York, N. Y.)

Jayco Products, Inc., Albany, N. Y., manufacture confections. $20,000. L. Jacobs, 837 71st St. L. J. Brunno, 1111 Neptune Ave., H. A. David, 42 Hawthorne St., Brooklyn, N. Y.

Whitecliffs Corporation, New York, N. Y., cement, $3,000,000. (United States Corporation Co.)

Deodex Products Fumigation Co., New York, compounds, 200 common, no par. A. Felber, E. R. Katz, W. Gotham. (Attys., Hyams & Hyams, 292 Madison Ave., New York.)